A COLLEGIATE BRASS TECHNIQUES CURRICULUM: AN INTEGRATED APPROACH

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A COLLEGIATE BRASS TECHNIQUES CURRICULUM: AN INTEGRATED APPROACH

The instrumental techniques and method classes at the collegiate level are extremely important to the success of future music educators. However, techniques curriculums often contain inherent problems, offering little or no real-life teaching experience for students. Many collegiate brass techniques curriculums are primarily performance-based, and lack an integrated pedagogical approach naturally indicative of classroom instruction.

This document is a brass techniques curriculum that integrates knowledge, performance skills, teaching, and practice, while addressing the pedagogy of all brass disciplines. This integrated approach to teaching brass instruments builds a foundation for music educators in brass instruction, and allows them to teach efficiently by knowing the commonalities to all brass instruments and the unique problems specific to each instrument. As a result, this curriculum provides experience for practical classroom instruction, a direct answer to the inherent problems of widely used curriculums in institutions across America.

The purpose of this document remains twofold: to establish a comprehensive collegiate course curriculum for future brass college professors, who will then be able to provide practical tools for future public school music educators to effectively teach the brass family to beginner, intermediate, and more advanced students. This shall be accomplished through the utilization of methods, concepts, literature, and principles of current brass pedagogical studies and writings. The student will learn the concepts of brass pedagogy, including performance, scholarship, maintenance, and repair for each brass instrument (trumpet, horn, trombone and euphonium/tuba).

This document outlines a detailed curriculum, accompanied with substantial prose that guides the student/teacher through a practical pedagogical approach to brass techniques. The materials presented in this project offer a standardized method and a reference handbook for music educators. The document is organized into three main sections. Section 1 focuses on the course curriculum outline and how a semester class would be organized to achieve the course objectives. Section 2 is a reference section, devoted to various and detailed pedagogical approaches in teaching each brass instrument. Section 3, or the "drill" section, deals specifically with classroom performance. The drill section will methodically walk the student from the beginning concepts of producing a sound to performing beginning and intermediate brass ensemble music.

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Chapter 1

Introduction

The instrumental techniques and method classes at the collegiate level are extremely important to the success of future music educators. Manny Brand's article, "Methods Class – Key to Improving Music Teacher Education," reveals that the biggest complaint of music educators is the lack of practical classroom instruction in college. Charles P. Schmidt's (1989), "An Investigation of Undergraduate Music Education Curriculum Content," reports that a brass techniques curriculum is found in nearly 96% of the schools investigated for the study. The Music Educators National Conference (2002), *Syllabi for Music Methods Courses*, attempts to show that instrumental techniques classes provide two major principles for the student: how to play and how to teach. However, I would argue that considerable confusion, controversy, and diversity exist regarding the practicality of various brass pedagogical curriculums, concepts, and methodologies. For example, Asbury College's brass methods class only requires students to play two of the four primary instruments (trumpet, trombone, horn, tuba). This approach limits the student's scope of education and raises concerns about his or her preparedness and ability to teach and perform the neglected instruments. The University of Nebraska's brass methods class is taught with a strictly homogenous approach (everyone plays trumpet, everyone plays horn, etc). Each applied brass faculty member teaches his or her area of expertise for four weeks, which makes it difficult to understand the connection and commonalities among the brass instruments. Further, Carnegie Mellon University primarily focuses on how to play the instrument, overlooking the importance of learning how to teach others to play, a necessary skill required for

successful future educators. All of these collegiate brass techniques curriculums contain inherent problems; offering little or no real-life teaching experience for students. Many of the aforementioned brass techniques curriculums are performance-based, and lack an integrated pedagogical approach naturally indicative of classroom instruction.

This brass techniques curriculum seamlessly integrates knowledge, performance skills, teaching, and practice, while addressing the pedagogy of all disciplines. This integrated approach to teaching brass instruments builds a foundation for music educators in brass instruction, and allows them to teach efficiently by knowing the commonalities of all brass instruments and the unique problems specific to each instrument. As a result, this curriculum provides experience for practical classroom instruction, a direct answer to the inherent problems of widely used curriculums in institutions across America.

The purpose of this document remains twofold: to establish a comprehensive collegiate course curriculum for future brass college professors, who will then be able to provide practical tools for future public school music educators to effectively teach the brass family to beginner, intermediate, and more advanced students. This shall be accomplished through the utilization of methods, concepts, literature, and principles of current brass pedagogical studies and writings. The student will learn the concepts of brass pedagogy, including performance, scholarship, maintenance, and repair for each brass instrument (trumpet, horn, trombone and euphonium/tuba).

Materials presented in this course will comprise a practical pedagogical approach to teaching brass, based on the methods, concepts, and principles of current brass pedagogical studies and writings, along with the leading pedagogical techniques from various masters. This structured pedagogical approach will allow music educators to

successfully teach all brass instruments and will demonstrate how to problem-solve in a variety of musical settings. This method capitalizes on the commonalities of the brass instruments, providing the music educator with a fundamental understanding of brass playing and then expanding on the subtleties of each instrument.

Through brass performance, students will learn the fundamentals of playing. By the end of the four-week instrument rotation, students will demonstrate proficiency in the areas of posture, hand position, breathing, embouchure, tone production, articulation, instrument assembly, and standard and alternate fingerings, which will be unique to each brass instrument. Students will receive continuous performance-based feedback from the instructor and will develop a concept for what is effective and ineffective. Through the assessment of their own and others' performance problems, students will identify intuitive prescriptive strategies for future students, which will be necessary to overcome common obstacles when learning a new brass instrument.

Class Organization

This brass techniques curriculum is organized for a heterogeneous class setting. The author believes a heterogeneous class setting offers more practical benefits for students than a homogeneous setting.

First, the heterogeneous class setting is perhaps the most practical arrangement for future music educators, as it offers a more realistic approach of teaching in public school systems where one would be teaching beginners in an ensemble or family group (brass, woodwinds, etc.) setting. The technical problems found within the brass family are closely related; topics like breathing, embouchure, tonguing, fingerings, and tone production can be connected in the heterogeneous class setting. This organization

involves simultaneous instruction on all of the brass instruments, and students will learn how to organize, teach, and succeed in what could be an overwhelming setting. This setting forms a brass ensemble, which helps the students develop a more characteristic brass sound quality and offers support for good tone quality, balance, phrasing, and intonation. The future teacher will also learn necessary rehearsal techniques for beginner brass players.

Second, the heterogeneous class setting helps to alleviate the common problem found in many schools and universities: instrument inventory. Depending on the size of class, many schools and universities do not have enough instruments to supply a homogeneous class setting with enough brass instruments. This curriculum and class organization is designed for a large class size of 16 to 20 students. This requires a school to supply only five trumpets, five horns, five trombones, five euphoniums, and five tubas at any given time, reducing inventory demands. Because few instruments are required, the department can supply high quality instruments.

Class Format

The brass techniques curriculum in the document is designed for a single, 16-week semester course format. The class can be presented as three 50-minute weekly classes (Monday-Wednesday-Friday), or two 90-minute classes (Tuesday-Thursday). This class format stays constant with course curriculum's found in most American universities and colleges.

The author feels that an ideal class format would be a single, 16-week semester, meeting five days a week. This ideal format would have the students performing and

teaching on the secondary brass instruments almost everyday. The arrangement promotes more progress and development in the field of brass performance and pedagogy.

Methods Books and Supplementary Textbooks

The brass techniques curriculum uses four band method books. The student will be required to purchase volume 1 of the trumpet, French horn, trombone, and tuba books. Each book will be used for four weeks and will be rotated out as the student switches instruments. This will allow the student to compare and contrast the following class methods, which vary in organization, pacing, techniques, and exercises. The following class method books are only suggestions, as newer methods become available they could be carefully evaluated by the instructor and substituted to keep the course current.

- Lautzenheiser: *Essential Elements 2000,* vol. 1 (Hal Leonard)
- O'Reilly/Williams: *Accents on Achievement,* vol. 1 (Alfred)
- Pearson: *Standard of Excellence,* vol. 1 (Kjos Co.)
- Smith/Crain: *Band Expressions,* vol. 1 (Alfred)

The benefit of using a class method book is that it often provides a sequence for associating fingerings/slide positions with notation. Most class method books focus on melodic based exercises, which allow flexibility for the brass techniques instructor to adjust class pacing, and implement concepts like ear training, improvising, transposition, and harmonization exercises for the students. There is the additional benefit of modeling the use of these methods for students who will likely use one or more of them in their future teaching.

The following are leading textbooks for a collegiate brass techniques and methods course. They provide valuable resources for the teaching of brass methods, as well as a thorough reference guide of brass instruments. These books provide the student with the

pedagogical, historical, and technical material a music educator would need for successful instruction.

Whitner, Scott. *A Complete Guide to Brass Instruments and Techniques,* 3rd ed. New York: Schirmer Books, 2006.

Bailey, Wayne, Patrick Miles, Alan Siebert, William Stanley, and Thomas Stein. *Teaching Brass: A Resource Manual*. 2nd ed. Boston: McGraw-Hill, 2008.

Bachelder, Dan. *Guide to Teaching Brass.* 6th ed. New York: McGraw-Hill, 2002.

Cummings, Barton. *Teaching Technique on Brass Instruments.* Troy,MI : Encore Music Publishing, 1997.

Modern brass techniques textbooks contain excellent original material and provide significant insight. But often, they are poorly organized, overly detailed, and are difficult for the student to follow. Usually the instructor is translating the textbook into terms that the non-brass player can understand. Therefore the author feels the aforementioned textbooks will work better as supplementary textbooks or reference guides for a brass techniques class.

Private Brass Lessons

Students are required to take one 30-minute private lesson with a professor or music major on each of the four brass instruments (trumpet, horn, trombone, tuba). The private lesson is intended for students to receive extra help outside of class and to learn new teaching approaches and problem solving techniques from a specialized instructor. The private lesson will also demonstrate the value of private instruction in a beginning band setting and encourage students to implement private instruction into their own music programs. Students will be required to record a brief summary of the lesson, citing specific concepts and techniques discussed by the instructor in relation to class concepts.

Each summary should be a minimum of one page, double-spaced. A lesson observation worksheet can be found in the appendix.

Brass Reading Summaries

Students are required to write a weekly reading summary. A total of ten summaries will be required; five will be written from *Instructional/Teaching Journal* articles and five will be written from *Secondary Texts.* The goal is to have the students find an article or chapter of a book that pertains to the instrument on which they are performing that week.

The assigned summaries will require students to become acquainted with the research and scholarship in the field of brass performance and pedagogy. The following are the leading journals and books from which the student can choose an article or specific concept from a book. Each summary will be at least one page in length (double spaced), and will be submitted with a copy of the article/concept.

Instructional/Teaching Journals

- *ITG Journal* (International Trumpet Guild)
- *The Horn Call* (International Horn Society)
- *ITA Journal* (International Trombone Association)
- *ITEA (formerly TUBA) Journal* (International Tuba and Euphonium Association)
- *Brass Bulletin*
- *The Instrumentalist*

Secondary Texts

Farkas, Philip. *The Art of Brass Playing: A Treatise on the Foundation and Use of the Brass Player's Embouchure.* Bloomington, IN: Brass Publications, 1962.

Farkas, Philip. *The Art of Horn Playing: A Treatise on the Problems and Techniques of French Horn Playing.* Evanston, IL: Summy-Birchard Co., 1956.

Johnson, Keith. *The Art of Trumpet Playing.* Ames, IA: Iowa State University Press, 1981.

Kleinhammer, Edward. *The Art of Trombone Playing.* Evanston, IL: Summy-Birchard Inc., 1963.

Phillips, Harvey, and William Winkle. *The Art of Tuba and Euphonium.* Secaucus, NJ: Summy-Birchard, 1992.

Davidson, Louis. *Trumpet Techniques.* Rochester, N.Y.: Wind Music, Inc., 1970.

Wick, Denis. *Trombone Technique,* 2nd ed. London: Oxford University Press, 1975.

Stewart, M. Dee. *Arnold Jacobs: The Legacy of a Master.* Northfield, Il: The Instrumentalist Publishing Co., 1987.

Frederiksen, Brian. *Arnold Jacobs: Song and Wind.* Windsong Press Ltd. 1996.

Nelson, Bruce. *Also Sprach Arnold Jacobs a Developmental Guide for Brass Wind Musicians.* Windsong Press Ltd, 2006.

Stewart, M. Dee. *Philip Farkas: Legacy of a Master.* Northfield, Il: The Instrumentalist Publishing Co., 1990.

*Brass Anthology: A Collection of Brass Articles Published in The Instrumentalist Magazine from 1946 to 1999,*10th ed. Northfield, IL: Instrumentalist Pub. Co., 1999.

Bushouse, David. *Practical Hints on Playing the Horn.* Melville, N.Y.: Belwin-Mills, 1983.

Little, Donald. *Practical Hints to Playing Tuba.* Melville, N.Y.: Belwin-Mills, 1984.

Lautzenheiser, Tim. *The Art of Successful Teaching: A Blend of Content & Context.* Chicago, IL: GAI Publications, Inc., 1992.

Griffiths, John R. *The Low Brass Guide.* Hackensack, NJ: Jerona Music Corp., 1980.

Hunt, Norman. *Guide to Teaching Brass Instruments.* 4th ed. Dubuque, IA: William. C. Brown Publishers, 1991.

Brass Portfolio (Notebook)

Students are required to maintain a brass portfolio. The brass portfolio is one of the most important aspects of the brass techniques course. This will become the students' personal reference book when they teach. This notebook will contain lecture notes, handouts, class exercises, teaching techniques, exams, readings, and summaries. The notebook is expected to be in a three-ringed binder and labeled with dividers. Students

are encouraged to continue to add new information that will help them develop as music educators throughout the semester.

Exams

There are three types of exams used in this curriculum to evaluate student progress: performance exams, teaching exams, and a written exam.

Performance Exams

Students will be required to perform on each of the four brass instruments studied (trumpet, horn, trombone, and tuba) in class. The playing exams consist of selected scales, assigned etudes, a student selected solo, and sight-reading (see the appendix). All of the aforementioned material will be performed with proper posture, correct embouchure, breathing, airflow, articulation, and concept of sound. The performance exam will take place outside of the regular class period with the brass techniques instructor present, and will be evaluated using a grading rubric (see the appendix).

Teaching Exams

Students will additionally be required to teach the four brass instruments studied (trumpet, horn, trombone, and tuba) through private brass lessons for a non-brass student. Students will apply knowledge learned in class to teach the beginning concepts of brass performance in a 20- to 30-minute lesson. The teaching exam will take place outside of the regular class period with the brass techniques instructor present, and will be evaluated using a grading rubric (see the appendix).

Written Exam

Last, students will be required to take one written exam (cumulative final). The written exam will cover all topics discussed in class. Topics include types of instruments

in the brass family, transpositions, brass maintenance and simple repair, brass pedagogical concepts discussed in lectures and readings, handouts, and common obstacles that arise when teaching brass students.

Grading Procedures

Grading of written exercises and exams will be fairly objective, but the grading of performance exercises will be more subjective. Criteria for this subjective evaluation will include clear evidence of an understanding of how the instrument functions and sounds. To help evaluate performance exercises, grading rubrics have been developed and can be found in the appendix.

- Active participation/attendance: 20%
- Playing Exams (4 exams): 20%
- Teaching Exam (4 exams): 20%
- Written Exam (Final): 10%
- Brass Portfolio (Notebook): 10%
- Private Brass Lessons (4 lessons): 10%
- Written Summaries (10 summaries): 10%

A+ 97% - 100%	B+ 87% - 89%	C+ 77% - 79%	D+ 67% - 69%
A 93% - 96%	B 83% - 86%	C 73% - 76%	D 63% - 66%
A- 90% - 93%	B- 80% - 82%	C- 70% - 72%	D- 60% - 62%

F Below 60%

Semester Schedule Example

The following is an example of a semester schedule for three 50-minute weekly classes (Monday-Wednesday-Friday). The schedule illustrates the brass lecture topics and daily drill concepts. The schedule also outlines instrument and method book rotation. The lecture and drill schedule can easily be adjusted to accommodate the class progress.

Week 1:
M: Syllabus / Schedule / Lecture: Brass Introduction (history)
W: Lecture: The Brass Instruments (Anatomy and Workings) / Check out instruments
F: First Concepts to Playing a Brass Instrument

Week 2:
M: Lecture: Brass Maintenance (lubricating brass) / Drill: Breathing and Buzzing
W: Drill: Breathing, Buzzing, and Sound
F: **Summary #1 due** / Lecture: Intro to the Trumpet (listening)

Week 3:
M: Drill: First Notes and Concept of Sound
W: Lecture: Brass Harmonics, and Transposition / Drill: Articulation
F: **Summary #2 due** / **Teaching Exam #1**

Week 4:
M: Sign-up for exam time / Drill: Special Request Monday
W: Review for Playing Exam
F: **Summary #3 due / Lesson #1 due / Playing Exam #1**

Week 5:
M: Check in and out / method book #2 / Intro to the Horn
W: Drill: Breathing, Buzzing, and Sound
F: **Summary #4 due** / Drill: Articulation

Week 6:
M: Lecture: Rotary Valve Maintenance & Anatomy / Drill: Range
W: Drill: Ensemble Balance and Blend
F: **Summary #5 due** / Drill: Volume

Week 7:
M: Lecture: Teaching Strategies & Problem Solving / Drill: Intonation
W: Review for Teach Exam / Drill: Review Beginning Concepts
F: **Summery #6 due** / **Teaching Exam #2**

Week 8:
M: Sign-up for exam time / Drill: Special Request Monday
W: Review for Playing Exam
F: **Summary #7 due / Lesson #2 due / Playing Exam #2**

Week 9:
M: Check in and out / Method Book #3 / Intro to the Trombone
W: Lecture: Cleaning a Brass Instrument / Drill: Breathing and Buzzing
F: **Summery #8 due** / Drill: Concept of Sound

Week 10:
M: Lecture: The Importance of Music Education / Drill: Technique
W: Drill: Ensemble set-up and balance
F: **Summery #9 due** / **Teaching Exam #3**

Week 11:
M: Sign up for exam time / Drill: Playing
W: Review for Exam (Private Lessons)
F: **Summary #10 due / Lesson #3 due / Playing Exam #3**

Week 12:
M: Check in and out / Method Book #4 / Intro to the Tuba/Euphonium
W: Lecture: Method Books / Drill: Compare beginning method books
F: Drill: Advanced Literature

Week 13:
M: Lecture: Teaching Strategies / Drill: Advanced Literature
W: Drill: Advanced Literature
F: Drill: Advanced Literature

Week 14:
M: Sign up for exam time / Drill: Special Request Monday
W: Review for Playing Exam
F: **Teaching Exam #4**

Week 15:
M: ***Notebooks due* /** Review for Teaching Exam and Final Written Exam
W: ***** Lesson #4 due / Playing Exam #4**
F: *Clean and Check in Instruments

Week 16:
FINALS WRITTEN EXAM

Chapter Summary

This chapter is designed to provide future collegiate professors a thorough brass techniques course curriculum, which will provide tools for future public school educators in the art of teaching brass. The provided tools—class organization; format; texts and materials; assignments; grading procedures and grading aids; and semester schedule presented in this document—will produce an integrated, practical, and realistic pedagogical approach for collegiate brass techniques curriculum as well as a reference tool for music educators. This newly structured pedagogical approach integrates teaching and performance, which will prepare music educators to successfully teach all brass instruments in a variety of musical settings and thus provide a sound musical foundation from which future music educators may grow.

Chapter 2

History of Brass Instruments

The main purpose of this chapter is to provide a brief historical background of the brass family. It is important for students to comprehend the establishment and evolution of the brass family, and how the historical instruments' intended purpose relates to the context of today's modern brass instrumental family. Students will understand where brass instruments originated, how they evolved, where they stand today, and why particular brass instruments perform specific styles of music. This chapter will also help explain why some brass instruments are transposed and others are non-transposed. Learning the history of brass instruments and their evolution gives students the knowledge to become well-informed music educators.

Prehistoric Brass Instruments

A brass instrument is simply defined as a "lip-vibrated instrument."[1] The earliest predecessors of modern brass instruments were made of organic materials, like hollowed branches (*dijeridu*), bones (*roria*), seashells (*conch*), and animal horns (*shofer*). These primitive instruments were used for communication, such as signaling long distances among tribe members and for ceremonial and religious rituals.

Aborigines of New Guinea and Australia used hollowed-out branches, called the *dijeridu,* to accompany funerals and ceremonial celebrations. In the Amazon, hollowed-out bones, called the *roria,* were used as war-trumpets to intimidate the enemy.[2] In the south Pacific islands, seashells called *conch,* were used to signal fish boats across large

[1] Anthony Baines, *Brass Instruments: Their History and Development*, Reprint (New York: Dover, 1980), 40.

[2] Baines, 1980, 48.

areas of the sea. Animal horns, like the *shofer,* were and still are used in traditional Jewish ceremonies like Rosh Hashanah and Yom Kippur. Several of these ancient brass instruments are still used in today's religious ceremonies and tribal gatherings.

Ancient Brass Instruments

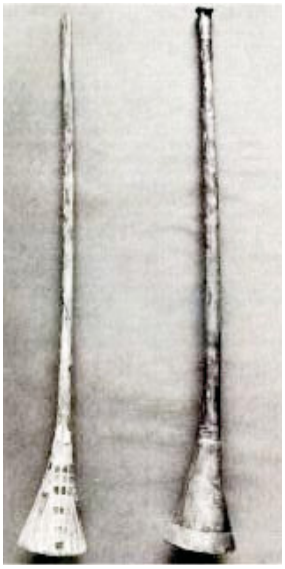

Figure 2-1: Egyptian Trumpets *(snb),* found in the tomb of Tutankhamen 1333-1323 BC (Egyptian Museum, Cairo). [3]

Similar to the organic instruments, the first metal-made brass instruments are known to have been used as far back as ancient Egypt. The trumpets and horns were built with a cupped mouthpiece, long cylindrical tubing with a bell flare, and were made of bronze or hammered silver. The Ancient Egyptian trumpet, called a *snb*, was thought to have been used as a military signaling instrument (directing and managing troops), and to support engagements and terrorize the enemy.[3] Instruments like the Hebrew *chatzotzrah* and *hassrah*, Roman *tuba*, and Greek *salpinx* were all types of ancient trumpets that resembled the early Egyptian model.

Another ancient metal-made brass instrument and a predecessor to the horn, called the Scandinavian *lur*, was created in the beginning of the sixth century BC.[4] Like the trumpet, these ancient horns were primarily used for communication for military and state occasions. The *lur* was a predecessor to instruments like the Etruscan's

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[3] Edward Tarr, *The Trumpet*, ed. Reinhard G. Pauly, trans. S. E. and Tarr, Edward Plank (Porland: Amadeus Press, 1988), 29. Photo taken from, Margaret Sarkissian and Edward H. Tarr, *Grove Music Online, Oxford Music Online*, http://www.oxfordmusiconline.com/subscriber/article/grove/music/49912 (accessed Feburary 10, 2010).

[4] James W. McKinnon. "Lur." In *Grove Music Online*. *Oxford Music Online*, http://www.oxfordmusiconline.com/subscriber/article/grove/music/17198 (accessed March 2010).

cornu and later the Roman *bucina,* which bear similarities due to the cupped mouthpiece and the circular shape with projecting bell.[5]

During the Middle Ages (c. 1100 – 1400), Europeans constructed the same style of brass instruments that the Egyptians had created. The early trumpet, called the *busine,* was also used as a signaling instrument, but now was associated more with more ceremonial nobility. The early horn began to take its traditional shape; it was constructed with shorter length and conically coiled tubing, which created the *hunting horn*. This style of horn was easily portable and playable from horseback and served as a reliable means of communication on hunting grounds.

The Natural Trumpet and Horn

The brass instruments of the Renaissance (1400 – 1600) began to see innovations in instrument making. The city of Nürnberg had become the leading city for brass makers during this period. Instrument makers experimented with different shapes and sizes to ease the mobility and increase the range of possible notes. The *busine* of the Middle Ages was six feet in length, making it difficult to handle and transport, so instrument makers discovered new methods of bending tubing, which created a flattened S-shape trumpet. By c. 1500, the S-shape changed to an elongated loop, thus creating the Baroque natural trumpet.[6] In France, the *cor de chasse* (French for hunting horn) also began its evolution as a refined concert hall instrument.

During the Baroque period (1600 – 1750), composers began writing more complex and artistic music for the natural trumpet and horn. Composers began to

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[5] Barry Tuckwell, *Horn* (London: Kahn & Averill, 1983), 5.

[6] Tarr, 1988, 54.

experiment with the horn as a means for indoor entertainment. As a result, the horn was incorporated into the orchestra after 1700 to provide specific tone colors, such as the depiction of a hunting scene. Both natural brass instruments were introduced into the realm of art music; composers like Monteverdi, Handel, Purcell, Telemann, and J. S. Bach began to write specifically for the natural trumpet and horn.

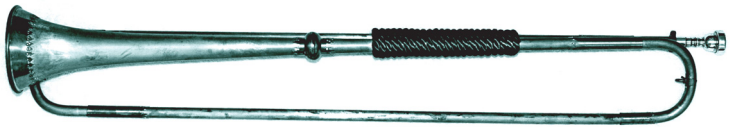

Figure 2-2: Natural trumpet (replica), Hanns Hainlein of Nürnberg, c.1632 *(Original Photo)*

Natural trumpets and horns of the Baroque period could only play notes within the overtone series, so performers were called upon to play in the *clarino register* (high harmonic range), where the natural harmonics were close together, which enabled the performer to produce notes of an entire scale. It was still necessary, however, to switch instruments if a composer wanted the performer to change keys. The impracticality of this soon led the instrument makers of the early 1700's to create "bits" and "crooks".[7]

Crooks and bits were used as additional tubing that changed the overall length of the instrument. When added to the instrument, these enhancements changed the pitch (the longer the tube, the lower the pitch), which allowed the same entire harmonic series to be played, now in different keys. Instead of carrying many instruments in different keys, horn and trumpet players would now only have to carry one instrument with a set of crooks and bits of varying lengths (see figure 2-3).

[7] Tuckwell, 1983, 24.

Figure 2-3: Natural horn with crooks, early 18th century *(Photo courtesy of Mr. Richard Seraphinoff)*[8]

Along with the instrument development, natural horn and trumpet players experimented with design techniques as well as new playing techniques. Anton Hampel (1711 – 1771) is credited with the development of "hand horn" playing.[9] Hand horn playing works by inserting the right hand inside the bell of the horn, which manipulates the natural harmonics (stopped notes), and allows the player to play a complete scale, which fills in the gaps between the notes of the harmonic series. The1750's hand horn playing became popular and took the horn to the next step in its evolution. The Classical and early Romantic periods (1750 – 1820) were considered the golden age of the hand horn.[10] During this time period the horn was recognized as a solo instrument and performers like Anton Hampel, Giovanni Punto, Ignaz Leitgeb, and Giovanni Puzzi were looked on as great virtuosic artist and teachers. The first instruments designed for hand horn technique were the *Cor Solo* (more of a solo horn) and the *Waldhorn* (more of an orchestral horn). While hand horn technique was a successful for horn players, natural

[8] Richard Serphinoff, *Natural Horns by Richard Seraphinoff*, March 2010, http://www.seraphinoff.com. Reprinted with permission.

[9] Tuckwell, 1983, 26.

[10] Tuckwell, 1983, 31.

trumpeters of France attempted to use the hand horn technique, but the new technique did not take hold across Europe.

Transitional Period for Brass Instruments

By the 1800's, there was a search for chromaticism. Europeans made advancements in brass instrument technology by adding keys (like the saxophone) to a trumpet, thus inventing the keyed trumpet (also the keyed bugle). This allowed players to perform notes in between the natural harmonics by opening and closing keys that shortened and lengthened the horn. Composers like Joseph Haydn and Johann Hummel composed concertos for this new instrument.

By 1815 several experiments with horn designs were being developed. The Omnitonic horn was intended to be a solution to the problem of quick crook changes. This horn contained a built-in collection of crooks, with a designed mechanism that would allow a player to quickly choose to play in any given key. The Omnitonic horn proved to be both cumbersome and heavy and was short-lived.

The keyed trumpet and omnitonic horn were soon replaced with another European invention in 1818: the valve.

Moveable Slides and the Trombone

The introduction of the moveable slide for brass instruments is an unclear development in the evolution of the brass family. Historians cannot be sure when and where it was truly invented or created, but it is widely accepted that the earliest predecessor to the modern trombone is the slide trumpet, which was developed during the fifteenth century (Figure 2-4).

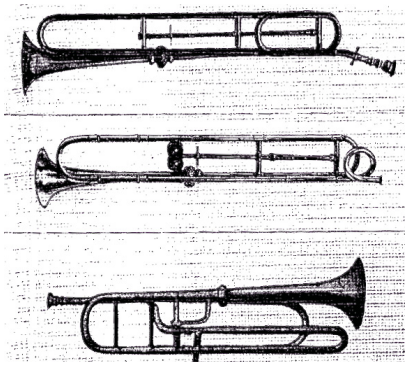

Figure 2-4: Slide trumpets[11]

The early slide trumpets used a telescopic mouthpipe, which was connected to the mouthpiece, and the trumpet body was pushed back and forth.[12] The use of a movable slide enabled the instrument to be played diatonically. Instrument makers later altered the slide trumpet, creating a telescoping "U" shaped slide that was initially called the *sackbut.* While the overall shape and layout of the instrument is the same as what exists today in the modern trombone, the *sackbut* was slightly different in design and in application. The earliest *sackbut* featured cylindrical bores with a narrow diameter, was made of various metals, and was significantly smaller than the modern trombone.

Figure 2-5: Sackbut with crook and bits *(Photo used with permission)* [13]

[11] Philip Bate, *The Trumpet and Trombone: An Outline of their History, Development, and Construction* (New York, New York: W.W. Norton, 1972), 136.

[12] Baines, 1980, 94.

[13] Alain Veylit, *Musicks Hand Made*, 2008, http://musickshandmade.com (accessed October 12, 2010). Rerprinted with permission.

The fifteenth, sixteenth, and seventeenth centuries saw the primary development of the *sackbut* largely in sacred settings. Paired with the cornetto, the *sackbut* became extremely popular throughout Europe's churches at the outset of the sixteenth century. The various sizes of *sackbut,* capable of a wide range of pitch and expression, were used to double the voices of the church choir. By the end of the sixteenth century, composers began to use the *sackbut* in a variety of different ways. Composers like Gabrieli and Schütz, used them for antiphonal sacred brass music, others added a group of them to an ensemble to provide a base sonority of harmony, and *sackbut* performers were added to court ensembles. There is even some solo music from this early era of *sackbut* history. However, by the end of the seventeenth century, the *sackbut* had fallen into disuse. Church composers' tastes changed, the orchestra and string quartet began to develop, instrument craftsmen disappeared, and there were fewer and fewer professional *sackbut* performers.[14]

Due to extensive design modifications of the sackbut, the trombone emerged in the last quarter of the eighteenth century, which was the beginning of the "modern" era. It was the military band that brought the trombone into a new age.[15] Military bands throughout Europe began to grow and expand during the late eighteenth and early nineteenth centuries, and bandmasters were interested in the sonority and low voice that a choir of trombones could provide.

The beginning of the Romantic era in music was great for the trombone. The tone and sonority of the trombone had long been associated with ideas of death and the

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[14] Bate, 1978, 138.

[15] Bate, 1978, 140.

supernatural. As composers during the nineteenth century looked for a variety of tone colors to portray such imagery, the trombone found its way into opera houses and orchestras for the first time.

Valve and the Tuba

The most revolutionary invention in the development of brass instruments was the valve c.1818. The significance of this invention was that the instruments were fully chromatic and every note had the same timbre. Invented by Heinrich Stölzel and Friedrich Blümel, the early valve was a long stroke piston. The valve soon replaced the crooks and hand horn techniques. These early valves inspired other instrument makers like François Perinet to develop the piston valve in 1839.[16] The Perinet valve is the direct predecessor to the modern-day piston valve. Alternatives to the piston valve are the rotary valve and the Vienna valve. These three valve systems are still used today.

The creation of the valve changed the course of instrument construction and led to the production of new brass instruments. The valve gave brass instruments great chromatic flexibility without the need for crooks, allowing tubing to be compacted and wrapped into a smaller physical space, essential to the baritone, euphonium, tuba, and cornet construction. Valves also harnessed the amplification power of the bell, giving valve instruments greater tonal strength.

At their initial creation, valves were not strong enough to handle large bore instruments. Stölzel developed a piston valve called the *Berline-Pumpe* that could handle these larger bored instruments. This new valve led to the creation of the first official tuba

[16] Tuckwell, 1983, 45.

by Prussian bandmaster Wieprecht (and Moritz) in 1835. Named *bass tuba,* it was pitched in F and had five *Berline-Pumpe* valves.[17]

Figure 2-6: Serpent[18]

The tuba and euphonium are the newest of the brass instruments, yet they have predecessors that reach far into musical history. Invented in France in c. 1590, many consider the *serpent* as one of the first of such predecessors.[18] Literally shaped like a coiled serpent, the instrument was made of two pieces of walnut, chestnut, plumb, or sorb wood glued together, with joints reinforced with animal skin or metal, and then completely wrapped in leather. The s*erpent* was introduced into French churches to provide a new timbre to choral music, and it also served to provide a center of pitch. Even though the instrument never served a "bass" function (this was left to the sackbut), the range, capability, and mellow tone of the instrument made it popular in churches across France.

During the early nineteenth century in Europe, instrument manufacturers developed the *ophicleide*. Created in 1817 by Jean-Hilaire Asté, the ophicleide was the newest member of the keyed bugle family. This instrument was created to match the tone of the serpent, while overcoming its shortcomings. The Ophicleide, meaning "keyed serpent," was made of brass, shaped like a bassoon, and, similar to the serpent, featured a metal "crook" that held a cup shaped mouthpiece for tone production.[19] Finger holes were

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[17] Bevan, 1972, 78.

[18] Clifford Bevan, "Tuba," *Oxford Music Online*, http://www.oxfordmusiconline .com:80/subscriber/article/grove/music/28525 (accessed August 30, 2010).

[19] Clifford Bevan, *The Tuba Family* (New York: Charles Scribner's Sons, 1978), 61-62.

covered by a system of nine to twelve keys and pads (like the modern day saxophone), allowing instrument makers greater control over where they placed tone holes in the instrument, thus aiding intonation.[20] The ophicleide was incorporated into bands and orchestras to maintain the low masses of harmony, and was strong enough to support and balance higher brass instruments.

While adding keys to an instrument added to its chromatic capability, it unfortunately affected tone and intonation. With the invention of the bass tuba, which maintained better intonation and sound, the ophicleide met its demise.

German bands and orchestras immediately adopted the bass tuba as the bass voice of the ensemble. Berlioz was the first to use it in France, slowly phasing out the ophicleide because the bass tuba could balance high wind instruments better and had a smoother, richer tone.[21]

Figure 2-7: Early bass tuba, C. Moritz Tuba c. 1835. *(Used with permission)*[22]

[20] J. Kent Mason, *The Tuba Handbook* (Toronto: Sonante, 1977), 11.

[21] Hector Berlioz, *A Treatise on Modern Instrumentation and Orchestration*, ed. Joseph Bennett, trans. Mary Cowden Clarke (London: Novello and Company, Ltd., 1858), 176-177.

[22] Phil Holcomb, *Phil's Rugs-n-Relics*, http://www.rugs-n-relics.com/Brass/tubas/1840-Tuba-German-E.html (accessed June 7, 2012). Reprinted with permission.

After the *bass tuba* had established itself, the tuba family began to evolve with the creation of the tenor tuba, the predecessor of the baritone and euphonium. Ferdinand Sommer, a Prussian bandmaster, developed the first instrument with the name "euphonium" in 1843, designed for the Prussian military bands.[23] Its dark, mellow tone and easy technique was perfect for the baritone voice of the military wind band. Different models and sizes of euphoniums and tubas with varying amounts of valves were developed for different ensembles.

During the mid-nineteenth century, Adolph Sax (inventor of the saxophone) began to develop a series of valve bugles, called "Saxhorns." He began to experiment with the possibility of creating a family of valve bugles that would cover all the needed pitches. Toward the end of the nineteenth century, these early saxhorns died out as other instrument manufactures in France and England began to develop their own style of Saxhorn. Sax's instruments influenced the English brass band tradition and the development of today's tuba family. The tenor tuba, baritone, euphonium, bass tuba, and contrabass tuba are all part of the valve bugle family.

Modern Brass Instruments

The late 19th century and the 20th century led to the modern brass instruments that we have today. The valve had become the standard practice for brass instruments. Advances in brass design brought forth larger bores, expanding bell flares, and intricate valve systems. The modern orchestra had established a standard brass section and composers were utilizing the brass section more in their compositions.

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[23] Bevan, 2000, 221.

The original cornet design was the new piston valve system applied to a *Post-horn,* creating the *patit cornet.*[24] This new conical bore instrument used a deep, funnel shaped mouthpiece. The sound of the cornet grew in popularity primarily in France. In modern times, the cornet is most commonly found in European brass bands, cornet solos, and is occasionally used in an orchestra when the score specifically calls for the instrument.

The trumpet had become associated with the orchestra while the cornet had become known as a solo and band instrument. During this time, the trumpet became the most popular instrument, and therefore the cornet was seldom used. The standard orchestra section had three trumpets. Soloist styles were changing with the times; different equipment such as mutes was starting to be required for trumpeters. Modern techniques and specific schools were emerging, leading to the development of the today's modern trumpet and player.

During this time, four horns became the "standard" orchestra section; the first and third horn parts were considered "high horn" and the second and fourth parts were considered "low horn." A standard section would have two Bb single horns on the high horn and two F single horns on the low horn. In 1898, the German horn maker Ed Kruspe designed and built the first double horn.[25] The double horn was basically a Bb single horn and F single horn merged into one horn, each with its own set of slides, but sharing a common mouthpiece, valve system, and bell. Today, the double horn is the most commonly used horn worldwide.

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[24] Baines, 1980, 226.

[25] Tuckwell, 1983, 54.

The trombone celebrated its own advancements during the late 19th and 20th centuries. Instrument craftsmen began to focus their efforts on the tenor and bass trombones (the valve horn made the alto trombone extinct). The tenor trombones were now being pitched in B-flat, the bass trombone added F and G attachments. Instrument craftsmen in the United States began to lead the world with their advancements to the instrument, including wider bore sizes, improved intonation, and lighter outer slides. The standard orchestra trombone section used three trombones: two tenors and a bass trombone. Beethoven (5th symphony, fourth movement) and Berlioz began to use the instrument with a much greater purpose with the composition of *soli* passages. Most often, the trombone was used to convey specific programmatic elements and images. The late Romantic era gave the trombone a much more important role and purpose in the music world.

The birth of jazz during the twentieth century continued to develop and change the trombone and trumpet's historic path. Big jazz bands, combos, and dance bands adopted the instruments as regular members, taking full advantage of their versatility and timbre. Various performers showed the world the never-ending musical capabilities of the trombone and trumpet, exploring the use of mutes, glissandos, and different types of attacks.[26]

During the modern era, the euphonium was primarily found in British brass bands, military bands, wind ensembles, and concert bands, but was also heard in specific orchestra works requiring a "tenor tuba", such as Mussorgsky's *Pictures at an Exhibition (Bydlo solo),* Holst's *The Planets,* and Richard Strauss' *Ein Heldenleben* and *Don*

[26] Anthony C. Baines, Arnold Myers and Trevor Herbert, *Trombone*, http://www.oxfordmusic online.com:80/subscriber/article/grove/music/40576 (accessed December 5, 2010).

Quixote. Currently, many composers and performers are working to advance the euphonium's role in music through the expansion of the euphonium's solo and ensemble repertoire.

As a modern instrument, the tuba became a primary member of the 20th century standard orchestra. The first composers to truly incorporate the tuba for its unique tone colors were Wagner, Mahler, and Strauss. However, the tuba was not taken seriously as a solo instrument until mid-twentieth century. It was Ralph Vaughn Williams' Concerto for Bass Tuba and Orchestra (1954) that provided the first momentous composition for solo tuba. More compositions followed, including Paul Hindemith's Tuba Sonata (1955) and Krzysztof Penderecki's Capriccio for solo tuba (1980). The twentieth century saw the rise of some of the greatest tuba performers and teachers in the world, creating a "golden age" for tuba repertoire and performance.

Chapter Summary

This chapter has provided a historical background of the brass family and the evolution of the trumpet, horn, trombone, euphonium, and tuba. From a utilitarian tool to a musical instrument, the earliest forms were constructed from natural materials, such as wood or animal parts, and the subsequent forms were constructed out of man-made materials, such as metal and brass. This chapter explains the performance abilities of each instrument as they evolved, beginning with the natural brass instruments (trumpet and horn), which could only play a set of specific notes, and the creation of the movable slide found in the trombone. Advancements with the invention of the valve enabled the trumpet, horn, and tuba to be played chromatically. This important chapter provides the music education student a deeper understanding of the evolution of brass instruments,

which will expand the student's working knowledge of modern brass instruments and how they have evolved throughout history.

Chapter 3

Fundamentals of Brass Acoustics

The main purpose of this chapter is to provide a basic understanding of the anatomy of brass instruments and how they work. It is important for students to comprehend the parts of the brass instrument and how they affect sound and playing quality. Through the study of this chapter, students will develop a thorough brass vocabulary and discover how and why brass instruments have inherent intonation problems. Learning the fundamentals of brass acoustics is critical to becoming better music educators.

The Anatomy of Brass Instruments

Brass Shapes

There are two basic shapes of brass instruments: conical and cylindrical. Conical shaped instruments describe a cone-shaped tubing. The instrument's construction is narrow at the start and gradually widens toward the bell flare. The characteristic sound of a conical shaped brass instrument can be described as dark and mellow. Conical shaped brass instruments include the horn, flugelhorn, cornet, euphonium, and tuba.

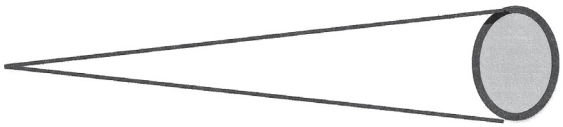

Figure 3-1: Conical shape *(Original diagram)*

Cylindrical shaped instruments describe a more cylinder-shaped tubing. The instrument construction is narrow at the start and remains the same diameter throughout the instrument until the bell flare. The cylindrical shaped instrument produces a brighter,

more projecting sound. Cylindrical shaped brass instruments include the trumpet and trombone.

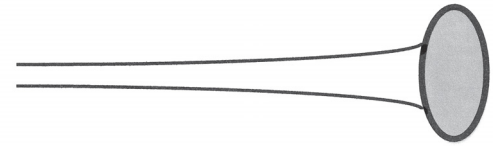

Figure 3-2: Cylindrical shape *(Original diagram)*

Brass Parts

All brass instruments have four basic parts: mouthpiece, leadpipe (or mouthpipe), body, and flared bell. The mouthpiece commonly has a cup and a tapered backbore. The leadpipe is where the mouthpiece is placed and has a conical taper. The body consists of the tubing, valve and/or slide section, and is ether cylindrical or conical shaped. Lastly, the flared bell is the section where sound exits from the interior of the instrument. The following diagram illustrates the parts of the brass instrument:

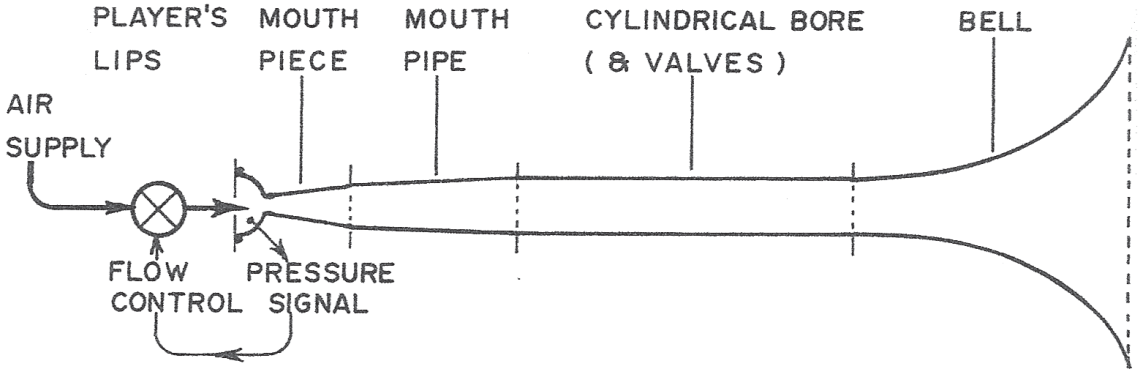

Figure 3-3: Basic parts of a brass instrument[1]

[1] Arthur Benade, *Fundamentals of Musical Acoustics* (New York: Oxford University Press, 1976), 392.

Mouthpiece

The mouthpiece is positioned on the lips to aid in compressing the air; as a result, the lips vibrate and produce sound waves. The brass mouthpiece consists of five major components: rim, cup, throat, backbore, and shank.

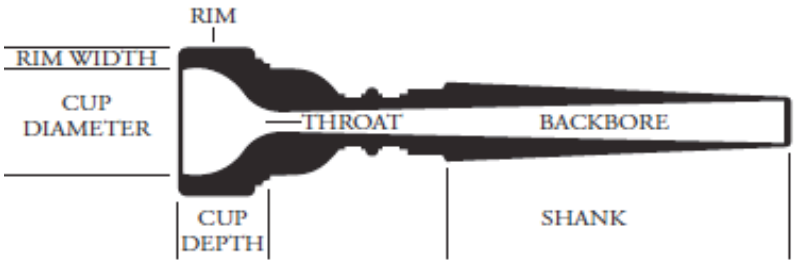

Figure 3-4: Parts of the brass mouthpiece[2]

The rim is the part of the mouthpiece that touches the lip. A varied thickness and contour of the rim edge controls tone quality, pitch, response, endurance, and comfort. A narrow rim will offer direct response and improves flexibility, and a wide rim offers increased endurance. A round contour rim improves comfort and a sharp contour increases brilliance and response.

The cup is the "bowl" shaped section of the mouthpiece. However, the cup can also have a "funnel" shape, which is used mostly on conical bore instruments. Varied depth, contour, and cup diameter can affect tone quality, pitch, response, and volume. A deep cup produces a full, dark sound and improves response in the low register, and a shallow cup creates a thinner, brighter sound and improves response especially in the high register. A large cup diameter increases volume and control, and a small cup diameter relieves fatigue and embouchure weakness.

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[2] Vicent Bach, "Bach Mouthpiece Manual," *Vicent Bach*, 2010, http://www.bachbrass.com/mouthpieces/ (accessed May 4, 2010). The mouthpiece manual is in PDF formate and must be downloaded to view. Diagram reprinted with permission for educational purposes.

The throat is the opening at the bottom of the cup. The throat regulates airflow from the cup. A large throat is open and increases the freedom, volume, and tone of airflow. A small throat increases resistance, endurance, and brilliance of sound.

The backbore is the conical flare from the throat to end of the mouthpiece. Various combinations of size and taper affect sound quality. In each instance, the effect partly depends on the throat and cup used in combination with the backbore.

The shank is the tapered part of the mouthpiece that is inserted into the leadpipe. The shank must fit properly in the leadpipe for a brass instrument to work correctly. There are different sizes and shapes of shanks. A shank that is too narrow will allow the mouthpiece to slide too far into the leadpipe and the notes will be sharp. A shank that is too wide will not allow the mouthpiece to move far enough into the leadpipe and the notes will play flat. The mouthpiece should fit snugly in the leadpipe without any movement.

Leadpipe

The leadpipe (or mouthpipe) is the section of the brass instrument in which the mouthpiece is inserted. The leadpipe consists of tapered tubing that serves as the crossing point between the mouthpiece and the instrument's body and main bore tubing, which is an essential factor in determining the intonation and sound quality that is characteristic of the instrument.[3]

[3] BMC the Music Source, *Glossary of Musical Instrument Terminology*, 2004-2010, http://www.bmcmusicsource.com/t-glossary-guide-musical-dictionary-terminology-terms.aspx (accessed April 11, 2010).

Body: Valves and Slide

The body of a brass instrument is the main tubing. The main tubing is either cylindrical or conical shaped, and consists of valves (trumpet, horn, euphonium, tuba) or a slide (trombone).

Valves within the body are the mechanisms on the brass instrument that are used to change pitch. Depressing a valve adds a certain length of extra tubing thus lowering the pitch. There are two main valve systems most commonly used today: the piston valve and the rotary valve.

The piston valve moves up and down, interrupting the flow of air. Extra holes in the piston line up with tubing and the direction of the airflow is altered. Piston valves offer light, quick, and immediate action providing greater flexibility in technical passages. However, piston valves have less direct and accurate airways. The piston valve is the easiest to maintain because it has only one moving section.

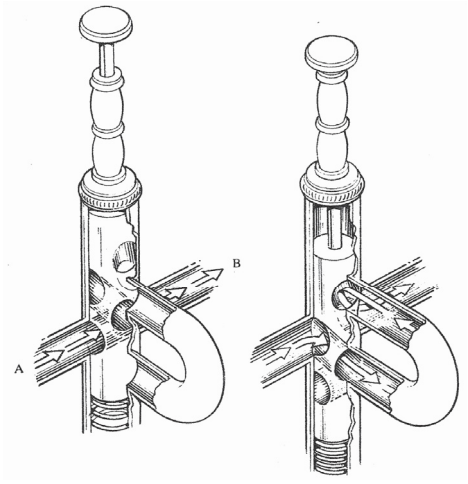

Figure 3-5: Diagram of how a piston valve works[4]

[4] Barry Tuckwell, *Horn* (London: Kahn & Averill, 2002), 46.

The rotary valve rotates the air column and changes the direction of the airflow. Rotary valves offer a short finger stroke and a more direct and open airway. Because the rotary valve has more moving parts (linkage, ball bearings, string) it may be more difficult to maintain.

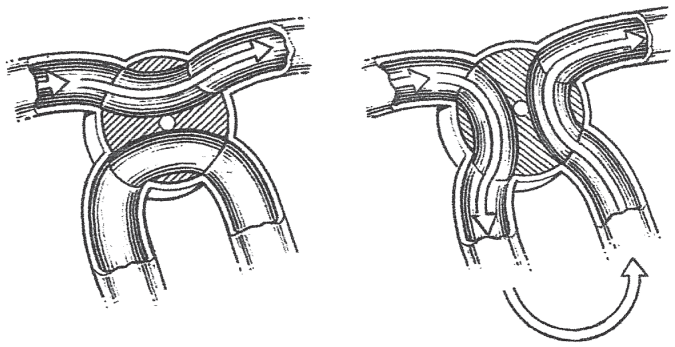

Figure 3-6: Diagram of how a rotary works[5]

Flared Bell

The flared bell is the section where sound exits the interior of the instrument. The bell flare affects the response, overtones, and tonal characteristics of brass instruments because it contains a reflecting point that helps regulate frequencies that create the natural harmonic series.[6]

[5] Tuckwell, 2002, 46.

[6] Benade, 1976, 399.

Principles of Sound and Pitch on Brass Instruments

Brass instruments are sounded through vibration of the lips, which produces a wave of air. This wave of air travels through the tapered bell flare, which creates the acoustical energy within the instrument. This enables the production of specific frequencies. The wave of air sets in motion a sound wave that reaches the instrument's expanding bell.

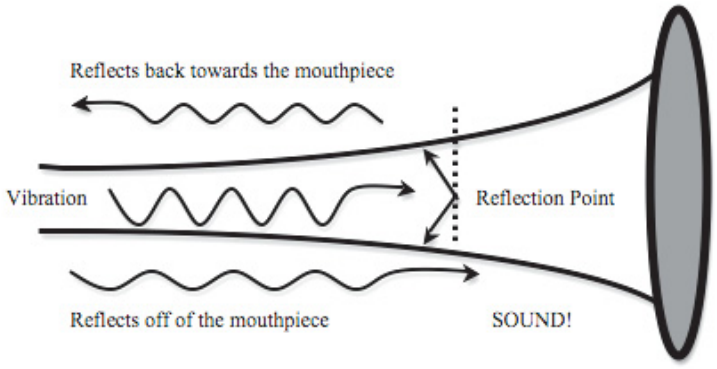

Figure 3-7: Diagram of how sound waves are produced in a brass instrument[7]

As the bell flare widens, the wave encounters resistance within the flared bell, causing the wave to reflect back toward the mouthpiece and the vibrating lips.[8] The wave is then reflected off the mouthpiece, and the vibration of the lips is modified by the reflecting wave so that its pattern of vibration corresponds to the instrument's timbre and pitch.[9] As the wave bounces back and forth, interacting with the instrument and the vibrating lips, the sound wave characteristic of the brass instrument is formed.

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[7] Figure 2-7 is an orginal diagram that summarizes Benade's principal of sound an pitch of a brass instrument of brass sound and pitch of a brass instrument.

[8] Benade, 1976, 397-98.

[9] Benade, 1976, 399.

The Harmonic Series

The harmonic series is the natural succession of notes that sound on a specific length of string,[10] or tubing in the case of brass instruments. The harmonic series is important for brass instruments because it allows different notes to be played from the same length of tubing, using the natural harmonics of the instrument. This is why many notes can be played with only three valves. Figure 2-8 is an example of the harmonic series; the first note is the fundamental, or first harmonic, and sixteen harmonics, or overtones follow, which can be produced for this specific length of tubing. The blackened note heads are the only chromatic tones produced in the harmonic series.

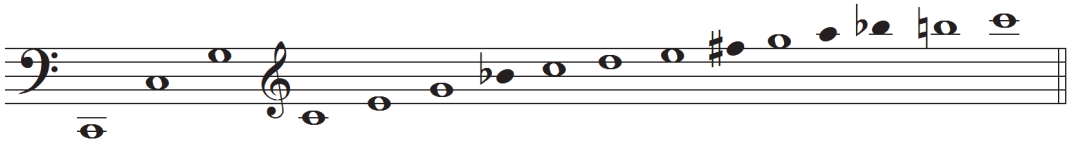

Figure 3-8: Harmonic series

Length of Tubing

The length of tubing determines the fundamental pitch of a brass instrument.[11] The following diagrams explain the length of tubing for each brass instrument and how they correspond with each primary instrument of the brass family. Notice all of the Bb instruments are symmetrically one-half the length of each other; Bb is the fundamental note for the BBb tuba, Bb trombone, and Bb trumpet, sounding exactly one octave

[10] John Backus, *The Acoustical Foundations of Music*, 2nd Edition (New York: W. W. Norton & Company, 1977), 109-10.

[11] Anthony Baines, *Brass Instruments: Their History and Development*, Reprint (New York: Dover, 1980), 25.

apart.[12] The F horn is approximately 12 feet long and F is the fundamental note. The F horn does not correspond symmetrically with the Bb instruments.

BBb tuba = 18 feet

Bb Trombone/Euphonium = 9 feet

Bb trumpet = 4.5 feet

F horn = 12 feet

Figure 3-9: Length of tubing chart *(Original diagram)*

The characteristic tone quality of a brass instrument is determined by the size of tubing (bore) and the amount of bell flare (cylindrical or conical).[13] As an example, the Bb trombone and the Bb euphonium both have 9 feet of tubing; however, they do not sound like the same instrument. The Bb trombone's bell flare is more cylindrical and the Bb euphonium's bell flare is more conical; this difference of shape creates the unique characteristic tone quality distinctive of each instrument. The same is true of the trumpet and cornet.

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[12] Baines, 1980, 26.

[13] Robert W. Pyle, "How Brass Instruments are Built: Art, Craft, Perhaps Even Science," *Acoustical Society of America 133rd Meeting Lay Language Papers*, 1997, http://www.acoustics.org /press/133rd/2amu4.html (accessed October 11, 2010).

Valve and Slide Positions Chart

The function of valves and slides on a brass instrument are to add tubing to the fundamental, lowering the instrument's harmonic series. For example, adding the second valve or second slide position will lower the fundamental a minor second. Generally, brass instruments today have three or four valves. Each valve lowers the fundamental a specific length of tubing. The following explains how each individual valve lowers the fundamental pitch.

1st valve: Lowers the pitch of the open instrument one whole step

2nd valve: Lowers the pitch of the open instrument one-half step

3rd valve: Lowers the pitch of the open instrument one and one-half steps (equals the length of the first and second valves combined).

4th valve: Lowers the pitch of the open instrument a Perfect 4th (equals the length if the first and third valves combine)

Figure 3-10: Individual valve lengths

Certain instruments like the tuba, euphonium, and piccolo trumpet have an added fourth valve, while some trombones have an added an F trigger valve. These valves connect the gap between the lowest valve combinations (1-2-3) and longest slide position (7th position) to the fundamental. This adds additional tubing, which allows the instrument to play more notes. Consequently, the forth valve and trigger help achieve better intonation with specific valve combinations: 1-3 may be played with the 4th valve, and the 6th position may be played with the F trigger.

Figure 3-11 is a valve to slide conversion guide. The valve, or fingering, is for Bb instruments (Bb trumpet, Bb euphonium, and BBb tuba) and the slide positions are for Bb trombones. Memorization of the following chart is strongly encouraged. Once the

fingering/slide position is known, any fingering or slide position can be recalled during rehearsals. The chart is using a three-valve system with added four-valve system and F-trigger in parenthesis.

Bb Fingerings:	0	2	1	1-2	2-3	(4) 1-3	1-2-3
Slide Positions:	1	2	3	4	5	6 (T)	7

Figure 3-11: Valve to slide conversion chart

Design Considerations

There are many brass design considerations that affect the sound and playing qualities of a brass instrument. Certain characteristics such as the type of metal, finish, metal mass, tubular bends, construction, and repair will affect the overall tone and playing quality.[14]

Brass instruments are commonly made from three types of metal (alloys): yellow brass, gold brass (a.k.a. red brass), and nickel-silver alloy. Brass alloys contain combinations of copper and zinc. Yellow brass is 70% copper and 30% zinc; gold brass is 80-85% copper and 20-15% zinc; nickel-silver is 65% copper, 25% zinc, and 10% nickel.[15] Professionals feel that these different types of alloys affect the instrument's overall timbre.

The brass instrument may have three different finishes: lacquer, silver plating, and gold plating. The clear lacquer finish is the most common finish on student-line

[14] Robert W. Pyle, "How Brass Instruments are Built: Art, Craft, Perhaps Even Science," *Acoustical Society of America 133rd Meeting Lay Language Papers*, 1997, paper accessed from http://www.acoustics.org/press/133rd/2amu4.html (accessed October 11, 2010).

[15] Discussions with Mr. Richard Seraphinoff and Dr. Robert Barclay during the *Natural Trumpet Making Workshop*, Bloomington, IN, summer 2008.

instruments, chosen for its durability and low cost.[16] Lacquer is a clear epoxy painted on the metal and baked under high heat. Lacquer seals the metal and protects it from wear and corrosion. The silver plated finish is more commonly found on intermediate and professional brass instruments and is more expensive. Plating can best be described as a thin film that is bonded to the brass through an electro-chemical process. Plating offers more durability and abrasion resistance than lacquers, though epoxy lacquers used today are not far behind in durability.[17] Lastly, some brass instruments can be gold-plated, a finish mostly found on professional brass instruments. Gold-plating is layered on top of silver–plating making this instrument extremely durable and abrasion resistant, but are very expensive. Notably, the different types of finishes produce different types of timbres. The general consensus among brass instrument manufactures and professionals is that lacquers produce a slightly darker sound than silver or bare brass.

The brass instrument's thickness and weight of the tubing's walls are design aspects that can affect the resonance, intonation, and overall sound. The thickness of the metal influences the speed of the sound wave by enhancing or dampening specific overtones. Proponents of this design believe that thicker metal offers a fuller and darker sound in the lower frequencies and aids in better intonation, and offers more consistent volume of sound without getting increasingly brighter. Detractors feel the thicker metal reduces the vibrations and dulls the resonance and brilliant qualities of the trumpet, thus making it more difficult to project. Therefore, this design aspect is an individual preference.

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[16] John Huth, *Brass Instrument Maintenance: A Survival Guide for Band Directors* (Red Wing, MN: Red Wing Technucal College, 1992), 13.

[17] Huth, 1992, 13.

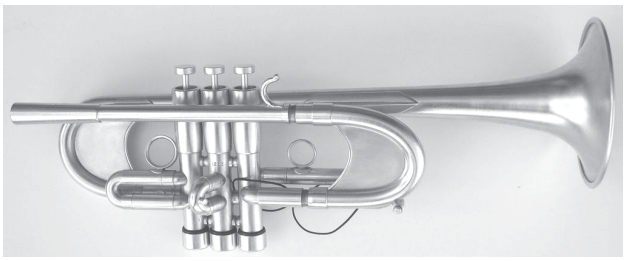

Figure 3-12: Heavyweight metal, Monette C trumpet *(Original photo)*

Bends within the tubing of a brass instrument and overall tubing assembly are two design aspects that can affect the playing quality. Sharp and tight bends have a tendency to restrict airflow compared to gradual and open bends, which generate less resistance. Examples of this design aspect can be found on trombone F trigger attachments with the closed wrap (sometimes referred to as traditional wrap) and the open wrap.

The closed wrap F trigger attachment is contained within the main body of the trombone and has more bends to fit in a small space. The closed wrap design has a tendency to generate a more constrained feel.

Figure 3-13: Tenor trombone with closed-wrap F attachment[18]

The open wrap F trigger attachment expands beyond the main body of the trombone and contains fewer bends. The open wrap design has a tendency to generate less resistance and maintains a freer feel.

Figure 3-14: Tenor trombone with open-wrap F attachment[18]

Mouthpieces that have added metal mass and weight have gained popularity during the past decade. There are several products designed to add metal mass and weight to standard mouthpieces. Proponents of this design say that it offers the player the ability to play louder without having the sound distort, while detractors of this design say it reduces mouthpiece vibration, and flexibility is sacrificed. Therefore it remains an individual preference.

A B

Figure 3-15: (A) Tradition shaped mouthpiece and (B) heavy walled mouthpiece[19]

The construction of the instrument can have an effect on the sound and playing qualities of brass instruments. Many student model instruments are mass-produced on an assembly line and, as a result, misalignments can occur and soldering joints can be weakened. Brass instruments that have been repaired numerous times can start to develop "work-hardening" stress to the metal, due to the heating and cooling of the metal

[18] Woodwind & Brasswind, *Brass Trombones*, http://www.wwbw.com/Trombone-Brass-Accessories1.wwbw (accessed October11, 2010). Reprinted with permission.

[19] Woodwind & Brasswind, *Brass Mouthpieces*, http://www.wwbw.com/Mouthpieces-Brass-Accessories1.wwbw (accessed October 11, 2010). Reprinted with permission.

during repairs.[20] The process starts to tear down the metal's compound and will consequently affect a brass instrument's resonance, intonation, and sound.

Chapter Summary

This chapter provided an overview of the anatomy and the principle of sound and pitch for brass instruments. The brass anatomy consists of two basic shapes: conical and cylindrical. There are four primary parts of the brass instrument: mouthpiece; the lead pipe; the body (valves and slides); and the bell flare. Each of these basic shapes and parts impact the characteristic tone quality of each brass instrument.

The principle of sound and pitch of the brass instrument begins with the harmonic series. The harmonic series is important for brass instruments because it allows different notes to be played from the same length of tubing, using the natural harmonics of the instrument. The length of tubing determines the fundamental pitch of each brass instrument. There are many brass design considerations that affect the sound and playing qualities of a brass instrument: the type of metal; finish; metal mass; tubular bends; construction; and repair.

By gaining an understanding of the fundamentals of brass acoustics, students will have the knowledge to teach brass more effectively and will be able to problem solve should issues arise with the instrument.

[20] Huth, 1992, 17.

Chapter 4

Brass Pedagogy - Fundamental Concepts of Brass Playing

The focus of this chapter will be on the fundamental concepts of playing brass instruments. The purpose of this chapter is to provide the teacher with an overview of pedagogical principles and techniques, emphasizing the commonalties among brass instruments as a foundation for music educators. First will be an applied approach of the fundamental concepts to starting a beginner brass class. Once the fundamental concepts shared by all brass instruments are understood, attention will be turned to the differences among the instruments, a detailed discussion of common beginner problems unique to the individual brass instruments and problem solving techniques and teaching aids for corrective teaching and learning will follow. The chapter ends with intermediate and advanced brass techniques focusing on teaching strategies.

Concepts to Starting a Beginner Brass Class

The following will outline a lesson plan design for teaching the fundamental concepts and the methods for starting beginner brass. The purpose of this section is to provide brass techniques students with a practical method for beginning instruction for teaching brass.

Concept of Sound

Perhaps one of the most important musical concepts to playing a brass instrument (or wind instrument for that matter) is the concept of sound. A performer must first develop a concept of the sound that they would like to achieve. The great brass artist and pedagogue, Arnold Jacobs, believed that students must first obtain a clear sound image in

their head and ear in order to produce a beautiful sound.[1] Students are encouraged to listen to recordings of professional brass artists demonstrating a clear sound image for the student in order to create their own concept of sound. Mr. Jacobs believed that musical thought and tone should be the impetus for performance, and that methodology and technique are, of necessity, their by-product.[2] By providing an excellent musical stimulus of the ideal sound, many other aspects of playing will fall into place.

Modeling and imitation methods are the most effective tools a teacher may use to establish a clear concept of sound for beginning students. A teacher will use modeling to establish the desired performance outcome; the modeling method provides multi-sensory experiences, through both visual and kinesthetic learning, as well as auditory information for the student. A student will then emulate the same qualities through imitation. Using the imitation method, students will be able to develop a good musical concept through listening and will learn to reproduce this musical concept through trial and error. Modeling and imitation are the keys that will guide the development of the student. Music educators should model daily through performance and recordings, so that students may gain a clear concept of sound.

Posture

Proper posture for playing a brass instrument is vital to good tone production and quality. Starting students early with correct standing and sitting posture will help create good habits, and will allow the student the ability to inhale a large volume of air without tension and restriction.

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[1] Bruce Nelson, *Also Sprach Arnold Jacobs: A Developmental Guide for Brass Wind Musicians* (Buchloe: Polymnia Press, 2006), 22-23.

[2] Nelson, 2006, 24-25.

The ability to inhale the maximum amount of air is greatest in the standing position.[3] When standing, the feet should be shoulder-width apart, the head held high, and the student should have a natural lumbar arch along the back just above the waist.

Once a good standing posture is formed, sitting should be treated as an extension of standing. Arnold Jacobs told his students to "stand while seated."[4] Sit on the end of the chair with nothing changing from standing position. The natural lumbar arch will be maintained for efficient inhalation.

Breathing

The development of correct breathing habits is one of the most important skills for brass players. Air is the fuel for a brass instrument and most beginners seldom take full breaths, thus creating difficulties in good tone production. Learning to inhale and exhale the amount of air necessary for playing a brass instrument can be difficult for beginners because it involves learning how to naturally take a full breathe, without creating body tension. It is important for beginner brass players to become familiar with the *"feel"* of a full inhalation followed by a focused airstream during exhalation.

The practice of breathing exercises is vital to developing correct breathing technique. The following are a series of breathing exercises taken from leading brass and wind instrument pedagogy texts that will compare *normal* breathing to *performance* breathing. The main focus concerning performance breathing is that it should be relaxed and natural.

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[3] Nelson, 2006, 35.

[4] Brian Frederiksen, *Arnold Jacobs: Song and Wind*, ed. John Taylor (Chicago: Windsong Press Limited, 1996), 130.

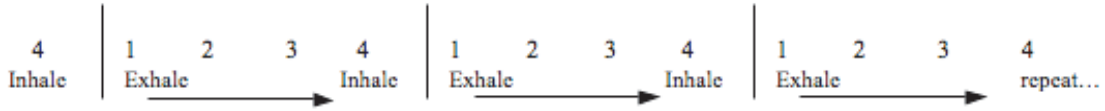
Beginner Breathing Exercises

The following beginning breathing exercises are designed to develop comfortable breathing, to create a steady airflow, and to breathe in time. The breathing exercise should be performed with a metronome, mm= 60-72, quarter-note is the beat.

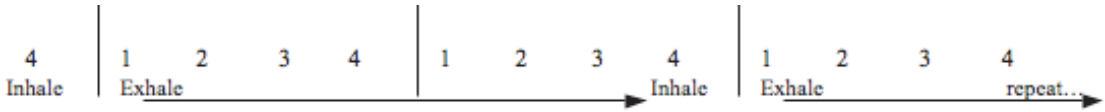
Step 1: Inhale a full breath on beat four. As one inhales, draw the hand toward the mouth.

Step 2: Exhale fully playing off of the "*rebound of the breath"* as the hand moves away from the mouth.[5] Do not hold the air after inhaling. Try to create a steady air stream by adjusting the aperture of the mouth.

A. Inhale for one-beat, exhale for three-beats.



B. Inhale for one-beat, exhale for seven-beats.



C. Inhale for one-beat, exhale for eleven-beats.

Figure 4-1: Steady airflow exercise[6]

[5] The beginner breathing exercises are variations taken from Donald Little and James D. Ployhar's book *Practical Hints on Playing the Tuba* (Melville, NY: Belwin Mills Publishing Corp., 1984), 9.

[6] Little, 1984, 9.

The following exercises will focus on rhythmic breathing. It is important to keep a constant rhythm without losing time on the rest. The student should achieve a full and relaxed exhalation, with a full inhalation in the written value of the rests. The exercise is recommended to be done with a plastic tube, approximately ½ inch in diameter, placed between the teeth to assist in opening the throat. This process will allow the student to "eliminate as much friction as possible, striving for a dark, quiet sound as the air rushes past the lips."[7] This exercise is also an excellent counting etude for introducing beginner students to rests.

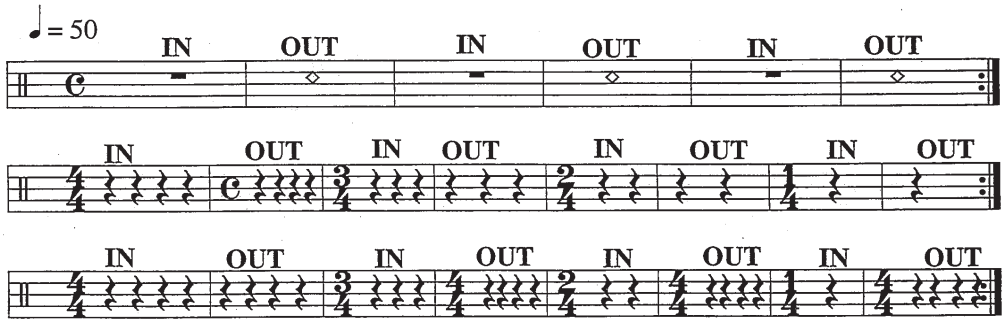


Figure 4-2: Rhythmic breathing exercise[8]

The Breathing Gym:[9]

Developed by Sam Pilafian and Patrick Sheridan, The Breathing Gym system is a series of stretches and breathing exercises that improve breath control and airflow. Their system has proven to help develop good sound, breath control, and efficiency of breath for brass players.

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[7] Charles G. Vernon, *A "Singing" Approach to the Trombone (and other Brass)* (Atlanta, GA: Atlanta Brass Society Press, 1995 revised Edition), 35.

[8] Vernon, 1995, 35.

[9] Sam Pilafian and Patrick Sheridan, *The Breathing Gym* (Focus on Music, 2007).

The following exercises are variations taken from The Breathing Gym, and can be used as part of a "warm-up, as a mid-rehearsal change of pace, or to address dynamics, articulation and phrasing."[10] The breathing exercise should be performed with a metronome, mm= 60-72, quarter-note is the beat.

Capacity and Airflow Studies[11] - This exercise stimulates and increases the lungs capacity and the flow rate.

Step 1: Inhale through the mouth (using the syllables "Oh" or "Whoa") for six beats, while inhaling, raise your arms up and out at your sides until you raise them over your head when full.

Step 2: Exhale through the mouth for six beats, lower your arms out and down to your side as you exhale. The goal is to encourage the rib cage to elevate and fill the bottom of the lungs up to the neck.

Flow Awareness and Air Speed [12] – The use of metaphors to describe the proper air speed to stimulate different dynamic and clean breath attacks. This approach works visual and kinesthetic learning processes.

Step 1: Fast Air – Pull your arm back as if you are pulling back a "bow and arrow." As you pull back, inhale as much air as possible. Once you are full, let the "arrow" go. As you let go, exhale all of your air as fast and in control as possible. This speed of air is for *f-ff-fff*!

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[10] Pilafian, 2007, 2.

[11] Pilafian, 2007, 8.

[12] Pilafian, 2007, 9.

Step 2: Comfortable Air – Pull your arm back as if you are "tossing a dart." As you pull back, inhale a comfortable full breath. Once you have comfortable breath, let the "dart" go. As you let go, exhale with enough speed to stick the dart (but don't throw the dart through the wall!). This speed of air is for *mp-mf-f*.

Step 3: Slow Air – Pull your arm back as if you are "floating a paper airplane." As you pull back, inhale a "conversation or whisper" breath. Once you have inhaled, let the paper airplane float. This speed of air is for *ppp-pp-p*.

Breathing Therapies[13] - This exercise uses vacuum pressure to stimulate abdominal activity and create a demand for air.

Step 1: Use the back of your hand to create a resistance when sucking in air. Take your hand away and allow the wind to rush in through the top. Exhale naturally.

Step 2: Repeat the same exercise, only this time; suck the back of your hand at the top of your breath.

Forming the Embouchure

The embouchure is the formation of the lips, mouth, chin, and surrounding facial muscles used to control airflow and produce vibration.[14] Blowing air *through* the aperture, or opening of the embouchure creates a vibration of the lips, which produces sound and pitch.

There is a fundamental embouchure formation for brass players with significant differences in tension and aperture size between the brass instruments. The trumpet and horn require smaller mouthpieces; a firmer embouchure with a smaller aperture is needed

[13] Pilafian, 2007, 10-12.

[14] Philip Farkas, *The Art of Brass Playing* (Bloomington, Indiana: Brass Publications, 1962), 5.

to produce a sound. The trombone, euphonium, and tuba require larger mouthpieces; a looser embouchure and a larger aperture are needed to produce a sound.

The following steps will develop a basic brass embouchure:

Step 1: Form the lips together by saying "um." (see diagram A, figure 4-3)

Step 2: Slightly pull the chin downward to separate the teeth. (see diagram B, figure 4-3) forming the mouth like one would blow on a hot cup of coffee.

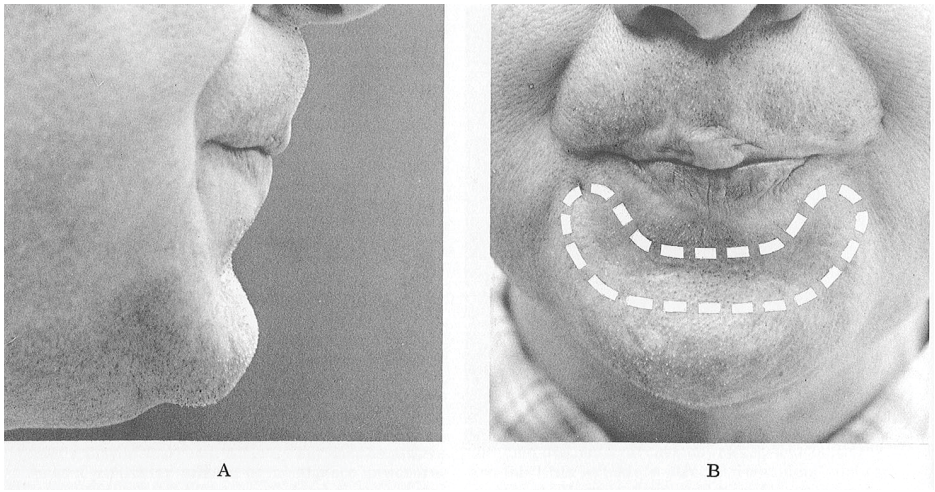

Figure 4-3: Brass embouchure formation[15]

Step 3: Inhale a deep breath and blow through this formed embouchure by saying "pooh" or "phew."[16] This will help create a slight pucker and the lips will naturally separate forming an aperture. Repeat this step until the student can effortlessly form the embouchure and keep a steady stream of air.

Step 4: Once the embouchure can be formed, integrate the embouchure with the aforementioned breathing exercises. Have the students form the embouchure as they exhale noticing how the embouchure controls the speed of the airflow.

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[15] Farkas, 1962, 18.

[16] Perantoni, 2001, 3.

Daily practice is necessary for full integration of breathing and embouchure concepts to be mastered by a beginner.

Mouthpiece Placement

The placement of the mouthpiece on the most optimal position on the lip promotes pitch-vibration. The mouthpiece rim should be approximately centered horizontally on the embouchure. The approximant vertical placement is usually 50/50 or 60/40. Some players may play off-center due to variations in dental structure and lip sizes. One should not focus on the *look* of the mouthpiece placement; rather the sound should be the primary focus.

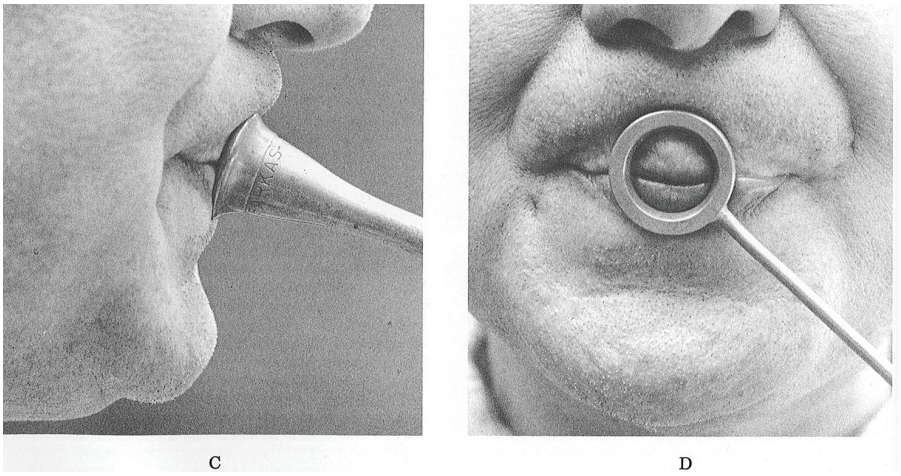


Figure 4-4: Mouthpiece placement and angle[17]

Mouthpiece Buzzing

Mouthpiece buzzing is valuable tool in developing good sound production. This concept helps focus the sound and isolates beginning concept problems (breathing, posture, embouchure formation, and mouthpiece placement). Not only does mouthpiece-buzzing help focus sound and strengthen the embouchure, it also helps with ear training,

[17] Farkas, 1962, 18.

by connecting the ability to hear a pitch in your head with the ability to play the pitch with your lips.[18] Buzzing the mouthpiece every day is an important part of learning a brass instrument.

Follow the above breathing, embouchure, and mouthpiece concepts to produce a buzz on the mouthpiece. The teacher should demonstrate a buzz first, and have the student imitate the sound.

Step 1: Inhale a large breath through the corners of the lips. Form the "um" shape of the embouchure and pronounce "pooh" or "phew" while blowing a fast stream of air across the lips. A natural buzz will sound. This process may take a multiple attempts. The "pooh" or "phew" attack will promote a natural buzz, opening and freeing up of the airstream.

Step 2: Once a "pooh" articulation is established, one can substitute the "p" with another consonants such as "t" or "d" ("tooh" or "dooh") by adding the tongue. The addition of the tongue will aid in the start of the vibration of the lips to create a controlled, clear beginning to the buzz.

Step 3: Once a steady constant buzz can be performed, practice the "siren" affect. Buzz a *glissando* up and down creating a siren sound. Through the use of vowels like "ee" and "oo," students will discover how tongue placement changes the air speed and pitch.

[18] Frederiksen, 1996, 148.

Tonguing and Articulation

Articulation on a brass instrument is produced when the tongue interrupts the airflow into the brass instrument. This helps focus the sound, articulate, and change notes. Tongue placement is crucial when trying to articulate on a brass instrument

Tongue placement for articulation is different and varies for all of the brass instruments. The trumpet and horn performers must create smaller oral cavities; the tongue placement is generally higher in the oral cavity. The tongue placement for trumpet and horn when articulating is approximately the back of the upper front teeth by the gum line. The most common articulation syllables for trumpet and horn are "tooh," "dooh," or "daah."

The trombone, euphonium, and tuba performers must create larger oral cavities; the tongue placement is generally lower in the oral cavity. The tongue placement for trombone, euphonium, and tuba is approximately the back of the front teeth and even between the teeth in some circumstances. The most common articulation syllables for low brass are "tooh," "dooh," and "thooh."

The instructor should explain and demonstrate tonguing on the mouthpiece. Once students can vary articulations and pitches, they should practice buzzing simple melodies on the mouthpiece:

- "Twinkle, Twinkle Little Star"
- "Row, Row, Row Your Boat"
- "Jingle Bells"

Assembling and Holding the Brass Instrument

A beginner brass student should be taught how to assemble, disassemble the instrument, and put it properly back in the case. During this time, the student should be

taught how to hold the instrument. A substantial amount of time should be taken when teaching these concepts to help avoid repairs and bad habits.

Brass instrument assembly is quite simple. The trombone is the only brass instrument for which some assembly is required in addition to inserting the mouthpiece into the receiver (see trombone assembly in Chapter 7). Knowing how to insert the mouthpiece into the brass instrument is a small detail, yet an important aspect of assembly. If taught early and properly, this action will alleviate stuck mouthpieces in the future.

Insert Mouthpiece:

Step 1: "Set" the mouthpiece into the receiver on the leadpipe.

Step 2: "Turn" slightly clockwise to tighten. This action will hold the mouthpiece snugly.

Remove Mouthpiece:

Step 1: "Turn" lightly counter-clockwise to loosen the mouthpiece.

Step 2: Gentley pull the mouthpiece out of the leadpipe.

Never force or use excessive pressure when assembling and disassembling the mouthpiece. The mouthpiece will become stuck, and the use of force could possibly break the leadpipe mounting braces.

Next, the proper instructions on how to hold the instrument should be explained. How the body and hands are positioned when playing the brass instrument is the starting point of good posture and tone production. This should be taught by modeling and imitation. The instrument is formed around the student's proper sitting/standing posture (See individual instrument posture in Chapters 5, 6, 7, 8, and 9)

The First Sound

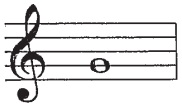
Once the student has performed the aforementioned concepts and these concepts can be easily replicated, it is time to produce the first sound. Naturally, students' first attempts usually will not be very successful. Considerable repetition will be needed to achieve the first sounds of success. The most important pedagogical principle the teacher should provide is a superior model for the students to imitate.[19]

Step 1: The first sound on a brass instrument should not begin on a predetermined pitch. The main objective of the first sound is for the student to start and hold a steady pitch.

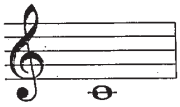
Step 2: Once a steady pitch is produced, the student can gradually be guided to one of the starting pitches. A good method is for the teacher to play a note on an instrument and ask the student to match pitch. A good starting note for all brass instruments to perform is a concert F. This is an open fingering for trumpet, horn, trombone, euphonium and tuba. Make note of the octave that specific instruments are playing. Horns and tubas have a tendency to start an octave higher than where they should be starting. Figure 4-5 shows the correct first pitch (concert F) and the correct octave.

[19] Daniel L. Kohut, *Musical Perfromance: Learning Theory and Pedagogoy* (Englewood Cliffs, NJ: Prentice-Hall, Inc., 1985), 115.

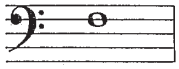
Bb Trumpet:



F Horn:



Trombone and Euphonium:



BBb Tuba:

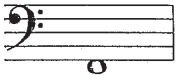


Figure 4-5: Starting pitches

Step 3: Once the students can match pitch and perform a steady tone, immediately have them buzz this tone on the mouthpiece. This will connect the mouthpiece buzzing frequency with the desired pitch on the instrument. The brass instrument is simply an amplifier of the buzzing lips.

Step 4: Return to the instrument and begin to perform "call and response" exercises. Still using concert F, the instructor performs simple rhythmic patterns and the students imitate what they hear. These exercises will reinforce starting pitches, articulation, style, dynamics, and sound production and will help develop the ear.

Step 5: Once the students have successfully and consistently produced the concert F, introduce a second pitch, concert Bb, below concert F. This will be easy for the trumpet, trombone, euphonium, and tuba because it is open fingering, but the horn will have to finger the concert Bb first valve. Once again, after the student can match this new pitch, immediately have them buzz this tone on the mouthpiece. Then have them buzz both the F and Bb pitches.

Step 6: Return to the instrument and begin to perform "call and response" exercises with the two new notes.

This method of modeling and imitation is intended to reinforce the beginning concepts outlined above and should be visited daily. The "call and response" exercises focus on ear training and listening. They are intended to develop a concept of sound, pitch production, articulation, and overall blend within the class. Don't rush the process; this can only create bad habits. Go slowly and after significant repetition, the student will learn the concepts correctly. Up to this point in the beginning stages of brass playing, students are not reading music. Method books and specific note reading can be introduced in the fourth or even fifth lesson.

Physical Elements of Tone Production

The main purpose of this section is to provide music educators the basic understanding of the anatomy of body and the physical concepts of the body while performing on a brass instrument. It is important for students to comprehend the parts of the body and how they affect sound, intonation, and tone quality. Students will develop a physical vocabulary and discover how and why brass players have inherent problems.

Tone production should be introduced to a beginner in a simple and direct method, as explained in the previous section ("Starting a Beginner Brass Class"). The following section dissects the physical elements of producing good tone quality. Later, if individual concepts are unsuccessful and/or bad habits appear, individual concepts should be dealt with in isolation. Although more technical than the previous section, the information in the following section is simplified into kinesthetic and auditory drills, designed for music educators to gain experience and knowledge in problem solving.

Principles and Methods of Tone Production

In order to produce good tone quality, centered tone, and good intonation, the student must use the "concept of sound."[20] As discussed earlier in the chapter, this is best achieved through listening, singing, and imitation. This will allow the student to focus on the performance goal and not the physical process. However, many brass teachers believe in developing the kinesthetic sensation of good tone quality and performance.[21] It is important to understand how kinesthetic sensation aids the auditory sensation. By understanding the primary factors that influence tone quality, one must first know the physical concepts: breathing apparatus, oral cavity, and embouchure.[22]

There are three elements that form the breathing apparatus: air volume, air speed, and air pressure.[23] Air volume refers to the amount of air used, air speed refers to the quickness of the airstream, and air pressure refers to the expiratory muscles that support both the air volume and speed.[24]

Kinesthetic examples of *air speed*:

- "Fog a mirror" or hot air, is an example slow air
- "Cool a cup of coffee" or cold air, is an example of fast air.

Kinesthetic examples of *air volume and air pressure*:

- Say "sssssss," air is under high air pressure with little air volume.
- Say "whooo," air is under low pressure with more air volume.

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[20] Nelson, 2006, 22-23.

[21] Kohut, 1985, 142, 199.

[22] Kohut, 1985, 189.

[23] Frederiksen, 1996, 118-119.

[24] Frederiksen, 1996, 119-120.

Examples of kinesthetic *sensation and auditory sensation*:

- "Yawning" is an example of maximum air volume, slow air speed, minimal breath pressure, and large aperture.
- "Whistling" is an example of minimum air volume, fast air speed, maximum breath pressure, and small aperture.
- "Blowing candles out on a birthday cake" is an example of maximum air volume, maximum air speed, maximal breath pressure, and small aperture.

The oral cavity is made up of the throat, voice box, and the tongue.[25] The oral cavity regulates the air volume and speed by varying size and shape through the use of vowels and syllables. The function of the vowels and syllables is to assist in tone production in various ranges. As the range goes higher, the oral cavity is more closed and the lower the range is more open. Figure 4-6 creates both a kinesthetic sensation and aural sensation of vowels and syllables:

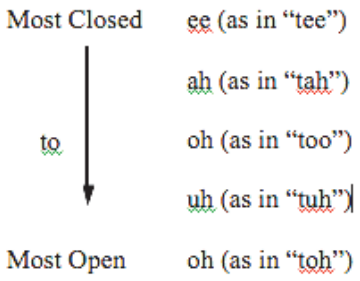

Figure 4-6: Vowels and syllables[26]

The embouchure is the formation of the lip used to produce vibration.[27] Blowing air *through* the aperture, or opening of the embouchure creates a vibration of the lips, which produces sound and pitch.

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[25] Frederiksen, 1996, 101.

[26] Ivan Trusler and Walter Ehret, *Functional Lessons in Singing*, 2nd Edition (Englewood Cliffs, NJ: Prentice-Hall, 1972), 84, 92.

[27] Frederiksen, 1996, 122.

All brass instruments require variables of air volume, air speed, air pressure, and embouchure (aperture size) working together to produce the desired goal. Having an understanding of the concepts of air volume, air speed, air pressure, and lips (embouchure) will help in teaching as well as problem solving.

Common Beginner Problems

When learning to play brass instruments, beginners will encounter several common problems. It is important for a teacher to be able to identify and solve the problems before they become habitual. Listed below are some common problems found in beginner brass players and possible solutions. It is important for a teacher to model correct solutions and to create analogies that that might help aid in solving the problem. In teaching brass instruments, it is essential to observe errors by sight and by sound.

Breathing Problems and Solutions

Shallow Breathing

Diagnosis: Often termed “upper-chest breathing,” a student's chest or shoulders rise during inhalation. The student’s sound will be thin and will sound labored as the student can only play two or three notes per breath.

Possible solution: Ask the student to "feel" the stomach expand while reminding them to keep their shoulders relaxed when inhaling a breath and to “visualize” deep breathing by comparing inhalation to filling a glass with water, filling from the bottom to the top of the lungs.

Set Breathing

Diagnosis: Holding the breath in for a short period of time before beginning to exhale. This problem is often identified by explosive attacks and overblown pitches. The breath should not stop between inhalation and exhalation.

Possible solutions: Have the student “visualize” a smooth turnaround of air by comparing it to bouncing a ball. Think of the air as the ball, and as the air enters the lungs it bounces directly out without stopping. Also, have the student attempt to articulate with a breath attack. Think of “blowing from the lips,” using no tongue.

Compression of Air

Diagnosis: Retention of "stale" air can often lead to tension in the chest and abdominal muscles or even to hyperventilation. This problem is found in all brass when playing in the upper register. The student is not expelling all of the air in the lungs before taking another breath. One can often spot this problem if you see a student playing only one or two notes per breath and often the student will exhale before taking another breath.

Possible Solution: Encourage the student to release all of the air in the lungs before inhaling to help correct this problem. Practice inhaling for two beats and exhaling for 12 beats trying to expel all of the air before inhaling.

Embouchure Problems

Smile Embouchure

Diagnosis: A student’s embouchure forms a “smile” as they play. One will also hear a thin, bright, and hard-sounding tone. The smile embouchure will affect the player’s upper range and endurance.

Possible Solution: Have the student attempt to “frown,” this will cause the student to relax the stretched-out (smile) of the lips and create a more pucker to the embouchure. Walk the student through the beginning embouchure methods (first: “mmm” second: “pooh”) will help to reinforce proper embouchure technique.

Cheek-Puffing Embouchure

Diagnosis: A student’s embouchure creates a “puffing” of the cheeks. Cheek-puffing is a common problem, which is found in beginning low brass players (euphonium, trombone, and tuba). One will hear a fuzzy, fluffy, and unsupported (weak) sound. Puffed cheeks will affect the player’s endurance and upper range.

Possible Solution: Remind the student to keep the corners firm and to make more of an “mmm” sound when forming the embouchure. Have the student use a pencil or pen, place it between the lips and have the student hold the pencil out parallel to the ground. The student will feel the corners tighten to support the pencil. This exercise cannot be performed with puffed cheeks.

Nasal Sound

Diagnosis: Often termed "squeezing" tone, usually caused by tension in the throat or abdominal muscles caused by tongue resistance, the tone produced is an unsupported, weak sound.

Possible Solution: The student should be encouraged to relax the throat (say “ohh”) and abdominal muscles. Ask the student to place the tongue on the bottom of the mouth (say “ahh”) and act as if they are blowing out candles on a cake.

Tonguing Problems

Explosive Attacks

Diagnosis: Building air pressure behind the tongue or "holding" onto air before releasing. One will hear "explosive" or unstable beginnings to notes and phrases.

Possible Solution: Have the student practice playing long tones using only air attacks, while simply disrupting the airstream with a light tongue. This will help with better coordination between the air and tongue.

Sliding/Scooping Attacks

Diagnosis: Tonguing with the throat or middle of the tongue creates a "dwa-dwa" sound. This problem is found in all brass, but mostly in low brass players because of the large oral cavity.

Possible Solution**:** Have the student practice tonguing attacks as if they had a piece of hair on the tip of their tongue, and attempt to "spit" it off. This will lower the tongue and create a more "pointed" attack to the articulation.

Advanced Techniques

The following are considered advanced techniques for beginners. The advanced techniques discussed in this section are lip slurs, multiple tonguing (double tonguing, triple tonguing), and vibrato.

Before students begin the advanced studies, it is imperative that beginners have a solid grasp of the fundamentals: concept of sound, centered tone quality, and single tonguing, all of which must be technically sound and rhythmically accurate. All of the following advanced studies outline how to teach and perform the specific technique. Each

technique should be practiced slowly and deliberately with the ultimate goal of clarity and technical accuracy.

Lip Slurs (Large Intervals)

Lip slurs are sometimes referred to as the "push-ups" for brass playing. Producing a lip slur on a brass instrument involves moving smoothly between two notes using the same valve combination or trombone slide position. The player moves to another pitch within the same harmonic series using only embouchure and air support.

To correctly play a lip slur one must change between notes without the use of the tip of the tongue. This is correctly done by simultaneously changing the airstream and lip pressure. Playing lip slurs on a brass instrument is not easy for beginners or even moderately experienced players. Practicing lip slurs is an important means of building embouchure strength and flexibility.

Playing Lip Slurs Correctly:

- Maintain firm corners of the mouth.
- Maintain a steady airstream throughout the slur (cold airstream for higher pitches and warm airstream for lower pitches).
- The tongue will naturally arch upwards when moving to higher pitches (ee) and naturally flatten when moving to lower pitches (ah).

The following exercise is developed to introduce lip slurs to a beginner. Practice the following exercise in chromatic consecutive order: open (no valves depressed), 2, 1, 1-2 and can add fingering combinations 2-3, 1-3, and 1-2-3. Once this exercise has been mastered, the student should be encouraged to attempt more advanced lip slur etudes. Note, the horn part is in parallel fifths with the other brass instruments to match fingering combinations and partials.

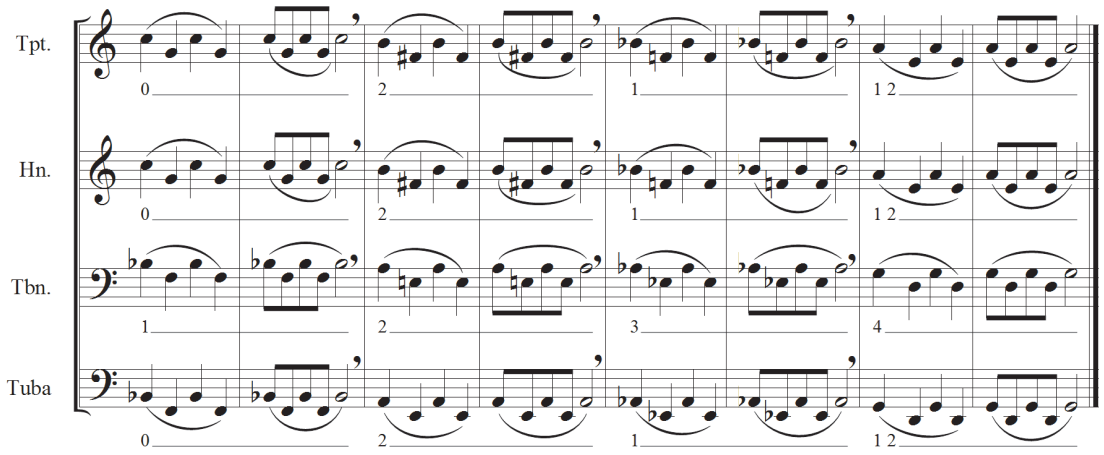

Figure 4-7: Lip slur exercise

Multiple Tonguing

When single tonguing cannot handle the speed demanded of a passage, or one's efforts sound labored, the special technique of multiple tonguing is required. There are two types of multiple tonguing: double tonguing and triple tonguing

The main difficulty in double and triple tonguing is achieving an even quality of sound used produced by single tonguing. In multiple tonguing, the follow-through is all-important. The tongue should act as "a flag flapping in the breeze" during multiple tonguing. When one shifts vowel sounds for multiple tonguing, the tone changes. Try to maintain consistent tone quality in all articulations.

Practice double and triple tonguing in *slow and direct comparison with single tonguing*. Because the size of the embouchure and oral cavity are different for each instrument, the consonant and vowel sounds listed below are different for high brass versus lower brass. Experiment with different vowel sounds, focusing on sound, control, and clarity, while promoting equality between syllables.

Double Tonguing Syllables

- Trumpets/Horns: "ta-ka," "tu-ku," "to-ko," or "ti-ki"
- Trombones/Tubas: "da-ga," du-gu," "do-go," or "to-go"

Triple Tonguing Syllables

- Trumpets/Horns: "ta-ta-ka," "ta-ti-ka," or "ta-ki-ta
- Trombones/Tubas: "da-da-ga," or "da-di-ga"

The following exercises are developed to introduce multiple tonguing to a beginner. They alternate single-tongue and double- or triple-tonguing techniques. The goal is to be unable to detect a difference in sound between the two procedures. Start slowly and gradually increase the tempo.

Quarter-note = 60

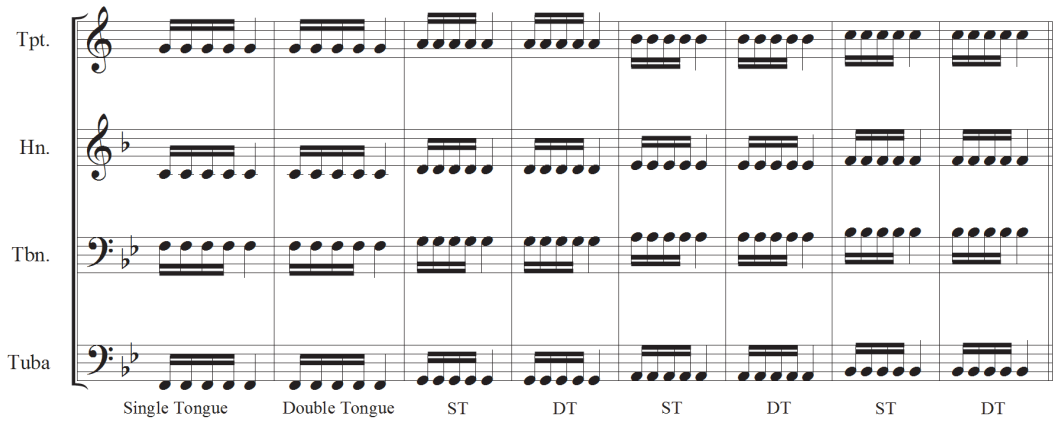

Figure 4-8: Double tonguing exercise

Quarter-note = 60

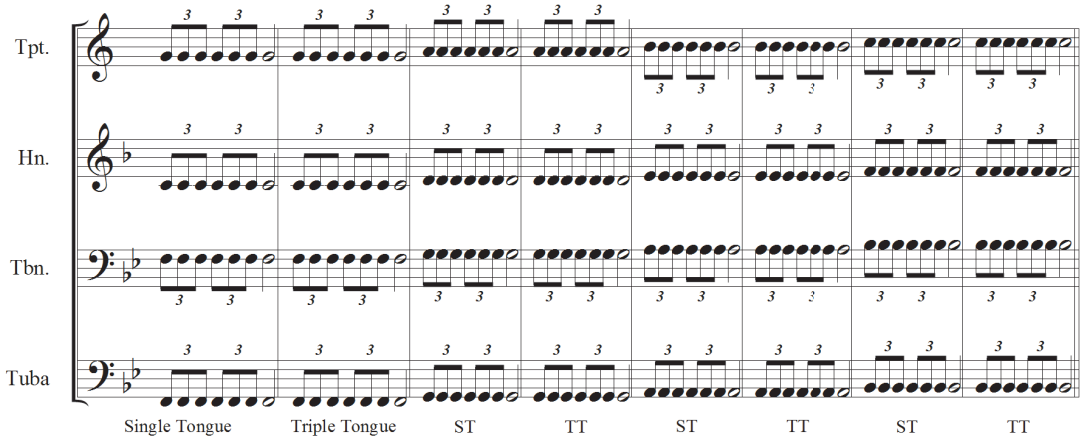

Figure 4-9: Triple tonguing exercise

Vibrato

Vibrato can be defined as a regular pulsating change in pitch or tonal intensity. Vibrato should be viewed as a means of adding color to one's sound, which can add character, sensitivity, and warmth to the tone when it is used in specific areas of the brass repertoire. Though vibrato should not be used in all circumstances, it is an essential aspect of brass solo playing and is used in some ensemble situations. Note, the horn traditionally doesn't use vibrato; however, specific styles such as jazz, the horn may be asked to use vibrato.

Vibrato can be taught once a good, consistent tone quality is achieved. Some musician/teachers hold that vibrato can't be taught, that it is simply imitated. The following are the five types of vibrato used today.

Lip and Jaw Vibrato

A downward motion of the lip and jaw produces lip and jaw vibrato while a note is sustained. This is one of the most easily controllable forms of vibrato and is the principle type of vibrato used by low brass players (trombone, euphonium, and tuba). Saying the syllables "woo-woo-woo," "ya-ya-ya," or "yo-yo-yo", will help create this vibrato.

Hand Vibrato

Hand vibrato is produced by a gentle rocking of the instrument back and forth into the lip flesh (e.g. putting slightly more pressure on the lip and releasing it). Trumpet players mainly use this method, because it can be easy to control.

Slide Vibrato

Slide vibrato is created by moving the (trombone) slide slightly inward and outward according to the desired speed. Trombone players in the jazz and studio fields use this method, because it can be easy to control with the slide.

Air Vibrato

Diaphragm vibrato is accomplished by pulsations in the air stream (similar to flute vibrato). This vibrato tends to be difficult to control, and is rarely used on brass instruments. To produce this vibrato method, one must vocalize an "ah-ah-ah" while pulsing the air stream.

Throat Vibrato

Throat vibrato is similar to the air vibrato. An oscillation of the airstream from the throat creates a subtle vibrato. This vibrato is difficult to control, and is rarely used on a brass instrument.

The following exercise is a simple melody to introduce vibrato. Vibrato should be added on the long held notes (m. 3 and m. 6). Attempt to add three to four wavers per note. Remember to be subtle with vibrato, do not distort the note or tone quality.

Quarter-note = 60

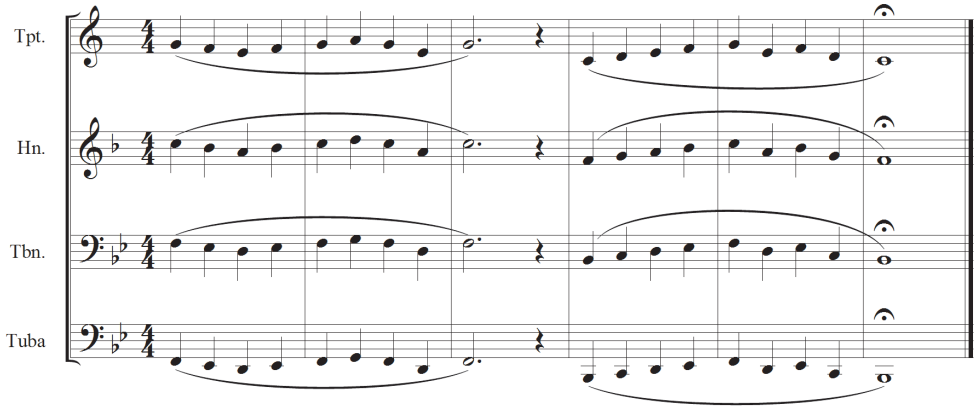

Figure 4-10: Phasing and vibrato exercise

Chapter Summary

This chapter focused on the common fundamental concepts and provided an overview of pedagogical principles and techniques of brass instruction. The aforementioned were the major concepts for starting a beginner brass class: concept of sound; posture; breathing; embouchure formation; mouthpiece placement and buzz; instrument assembly; and first sounds. This chapter discussed common beginner problems unique to the individual brass instruments and provided problem solving techniques and teaching aids for corrective teaching and learning. Intermediate and advanced techniques were discussed and teaching strategies were provided for lip slurs, multiple tonguing (double tonguing, triple tonguing), and vibrato. The tools found in this chapter outline the main concepts of starting beginner and intermediate brass players and provide pedagogical approaches to improved brass instruction for music education majors.

Chapter 5

The Trumpet

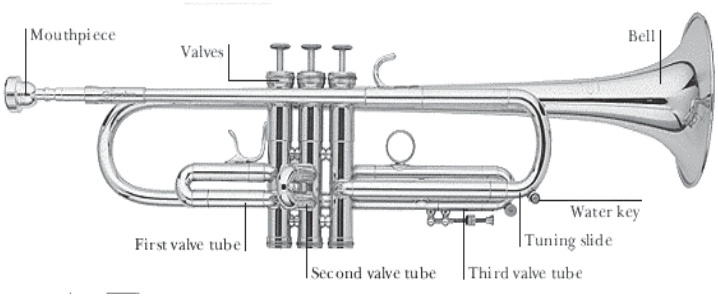

Figure 5-1: Parts of the trumpet *(Photo used with permission)*[1]

The trumpet is a cylindrical bore instrument and serves as the soprano voice of the brass family. The trumpet family consists of several instruments ranging in different keys and sizes. The trumpets commonly made available are the following:

- Bb/A Piccolo Trumpet
- E/F/G Trumpet
- D/Eb Trumpet
- C Trumpet
- Bb Trumpet
- Bb Cornet (cylindrical)
- Flugelhorn (cylindrical)

The Bb trumpet is the most commonly used trumpet. The Bb trumpet and Bb cornet are the standard beginning instruments because they offer a young student the opportunity to master the fundamentals and develop the correct tone.

The length of the Bb trumpet and Bb cornet is approximately 4.5 feet long (131 cm)[2] and it has a practical written range of low f# - d^2. Even though both the Bb trumpet and Bb

[1] David M. Grasmick, *California State Polytechnic University, Pomona*, 2008, http://www.csupomona.edu/~dmgrasmick/mu330/Trumpetlecture.html (accessed January 26, 2010). Reprited with permission for educational purposes using Microsoft Musical Instruments, 1994.

cornet have the same length of tubing, the Bb trumpet is more cylindrical shaped and the Bb cornet is more conical shaped, producing different timbres. The size of tubing (bore) and the degree of conical flare establishes the characteristic tone quality of both instruments.

The Bb trumpet and Bb cornet are transposed instruments and sound a major second lower than written.

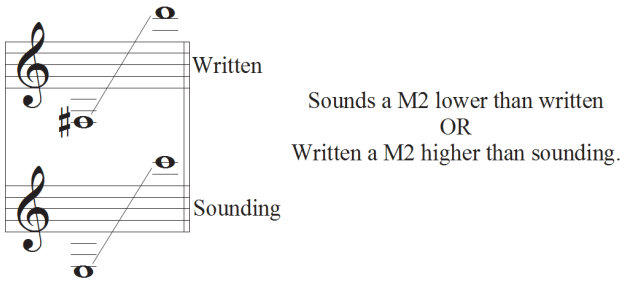

Figure 5-2: The range and transposition of Bb trumpet[3]

Music educators should have an understanding of the practical ranges of beginning, intermediate, and advanced trumpet students. A student's range will vary according to experience and ability. Range can be extended when the fundamentals of embouchure formation and tone production are mastered. The following chart serves only as a guide for music educators in determining range ability.

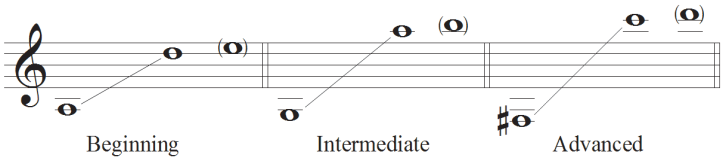

Figure 5-3: Beginning, intermediate, and advanced trumpet range[4]

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[2] Anthony Baines, *Brass Instruments: Their History and Development*, Reprint (New York: Dover, 1980), 26.

[3] William J. Skeat, Harry F. Clarke and Russell V. Morgan, *The Fundamentals of Band Arranging* (New York: Sam Fox Publications Company, 1965), 17.

[4] Mark C. Ely and Amy E. Van Deuren, *Wind Talk for Brass* (Oxford: Oxford University Press, 2009), 198.

Modern Trumpets

Today's modern trumpets can be categorized into two basic types: standard trumpets and specialty trumpets. The standard trumpets would be used for common playing occasions. The specialty trumpet is used for the high tessitura and specifically keyed compositions.

Standard Trumpets

There are two standard trumpets, the Bb and C trumpet. The standard trumpets can be heard in virtually every type of ensemble: wind ensembles (Bb and some C), symphony orchestras (C and some Bb), jazz bands (Bb), and rock bands (Bb).

Bb Trumpet (Standard)

Figure 5-4: Yamaha YTR-4335G Bb trumpet *(Photo used with Permission)*[5]

The Bb trumpet is a transposed instrument and sounds a major second lower than written. It is the most common trumpet played in public schools, colleges, and in the professional field. Practically all band literature is written for Bb trumpet, and the Bb trumpet is also the jazz performer's primary instrument. The Bb trumpet can be heard in an orchestra section for a desired darker sound, especially in Europe, and are sometimes used to handle difficult technical passages.

[5] The Woodwind & Brasswind, *Bb Trumpets*, 2006, http://www.wwbw.com/Bb-Trumpet-Trumpets1.wwbw (accessedFebruary 7, 2010). Reprinted with permission.

C Trumpet (Standard)

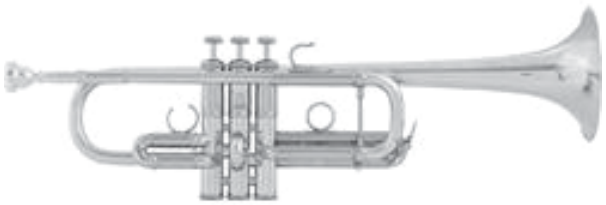

Figure 5-5: Bach AC190 Stradivarius Artisan Series C trumpet *(Photo used with permission)*[6]

The C trumpet is a non-transposing instrument. Shorter than the Bb trumpet, the C trumpet has a brighter timbre allowing the player to project the sound with less effort. The C trumpet is widely popular as the standard orchestral trumpet, but can also be heard in wind ensembles and brass quintets.

Specialty Trumpets

There are basically four specialty trumpets, the D, Eb, E/F/G, and the piccolo Bb/A trumpet. These specialty trumpets can be heard in Baroque ensembles, specific keyed solos, commercial music, and brass chamber music.

Eb and D Trumpet (Specialty)

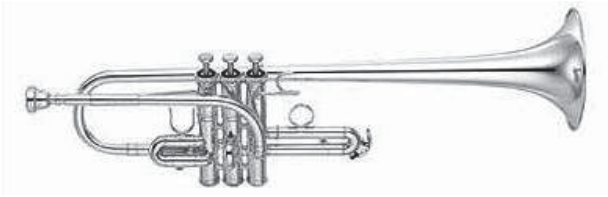

Figure 5-6: Yamaha YTR9610 Eb and D trumpet *(Photo used with Permission)*[7]

The Eb and D trumpets are frequently used for high tessitura and simplification of fingerings for specific passages. Today, these specifically keyed trumpets are featured in the performance of Haydn and Hummel concertos, brass quintets, and specific orchestral

[6] The Woodwind & Brasswind, *C Trumpet*, 2006, http://www.wwbw.com/C-Trumpets-Trumpet1.wwbw (accessed November 20, 2012). Reprinted with permission.

[7] The Woodwind & Brasswind, *Eb and D Trumpets*, 2006, http://www.wwbw.com/Eb-Trumpet-Trumpets1.wwbw (accessed February 7, 2010). Reprinted with permission.

passages.[8] Some Eb and D trumpets are designed to be two trumpets in one, with an interchangeable bell to change key (see figure 5-6). It has been said the brilliant tone of the Eb and D trumpets blends well with voices and strings.

E, F, and G Trumpets (Specialty)

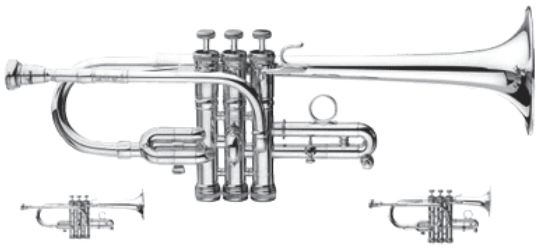

Figure 5-7: Stomvi USA E/F/G trumpet *(Photo used with permission)*[9]

The E, F, and G trumpets are most frequently used on *clario* parts of Baroque and Classical literature. The E trumpet is mostly used when trumpet players desire to play the Hummel Concerto in its original key of E instead of Eb. The F trumpet was developed to make Bach's Second Brandenburg Concerto easier to play.[10] Some E, F, and G trumpets are designed to be three trumpets in one, with an interchangeable bell to change key (see figure 5-7).

Piccolo Trumpet Bb/A (Specialty)

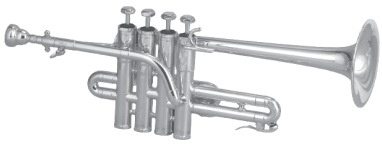

Figure 5-8: Schilke P5-4 Bb/A piccolo trumpet *(Photo used with permission)*[11]

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[8] Roger Sherman, *The Trumpeter's Handbook: A Comprehensive Guide to Playing and Teaching the Trumpet* (Athens, Ohio: Accura Music, 1979), 49.

[9] Stomvi USA, Art & Technology, *EFG Trumpet*, 2009, http://www.brassspa.com/instruments/trumpet_EFG_titanium.html (accessed January 30, 2010). Reprinted with permission.

[10] Ely ,2009, 186.

[11] The Woodwind & Brasswind, *Piccolo Trumpets*, 2006, http://www.wwbw.com/Piccolo-Trumpets-Trumpets1/wwbw (accessed February 7, 2010). Reprinted with permission.

The Bb/A piccolo trumpet is used today for the high tessitura playing. It is half the length of a Bb trumpet (approximately 2.25 ft or 62 cm) and sounds an octave higher. An extension on the leadpipe changes the pitch from Bb to A, allowing the player to adjust the pitch for transposition proposes. Built with a fourth valve, this extends the range of the piccolo trumpet down a perfect fourth, expanding the literature that can be played on the piccolo trumpet. Today the piccolo trumpet may be heard in Baroque ensembles, specific keyed solos, commercial music, and brass quintet works, and has become a standard part of the professional trumpet player's equipment.

Cornet (Specialty)

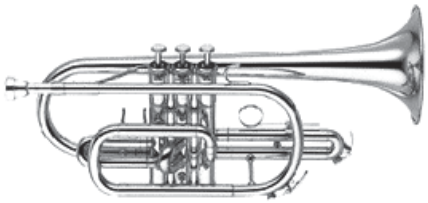

Figure 5-9: Yamaha YCR-2330II Bb cornet *(Photo used with permission)*[12]

Today, the cornet is considered a specialty instrument used mostly for period literature of late 19th and early 20th century. The cornet is a conical bore instrument and uses a deep, funnel shaped mouthpiece. The cornet is most commonly found in European brass bands, cornet solos, and is occasionally used in an orchestra when the score specifically calls for the instrument. Quite a few traditional band pieces have both trumpet and cornet parts, generally three cornet parts and two trumpet parts. While these can be treated as five parts all played on trumpets, sometimes cornets and trumpets are used for the difference in timbre. In some music programs, the cornet is still used as a standard beginning instrument. The Bb cornet and Bb trumpet share the same range,

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[12] The Woodwind & Brasswind, *Cornets*, 2006, http://www.wwbw.com/Cornets-Brass-Instruments1.wwbw (accessed February 7, 2010). Reprinted with permission.

fingerings, technique, and method books. However, the cornet is more compact, creating extra resistance, easier flexibility, and a more comfortable hold for petite students. These traits are particularly important to the beginning student and are reasons why some music educators favor starting their students on cornet. Some music educators feel that a beginner usually gets a good tone quality earlier with the cornet and this concept will initially help students later when they switch to trumpet.[13]

Flugelhorn (Specialty)

Figure 5-10: Yamaha YFH-631G Bb flugelhorn *(Photo used with permission)*[14]

The Bb flugelhorn is a specialty instrument used primarily in jazz and commercial music. As a part of the bugle family, the flugelhorn is a conical bore instrument and uses a deep funnel shaped mouthpiece. On occasion, the flugelhorn will be scored for wind ensembles and brass quintets. It has come into prominence as a solo voice with its dark and mellow characteristic tone quality. The flugelhorn uses the same fingering system as the Bb trumpet and basically covers the same range. However, due to the flugelhorn's conical bore, it is difficult to center the tone on notes above the staff.[15] It is considered a standard part of the trumpet player's equipment

[13] Sherman, 1979, 41.

[14] The Woodwind & Brasswind, *Flugelhorns*, 2006, http://www.wwbw.com/Flugelhorns-Brass-Instruments1,Page-1.wwbw (accessedFebruary 7, 2010). Reprinted with permission.

[15] Sherman,1979, 43.

Fundamental Concepts of Trumpet Playing

The following are fundimental concepts of trumpet playing. They cover the beginning concept of hand position, playing posture, embouchure, mouthpiece placement, and articulation. There are step-by-step details and photos to help guide the student.

Hand Position and Playing Posture

Step 1: Place your left hand around the valves. Place your left middle finger or ring finger in the third valve ring and thumb in the first valve ring.

(A) (B)

Figure 5-11: Left hand position (A) and right hand position (B) *(Original photo)*

Step 2: Place your right thumb under the lead pipe, or between the first and second valve, your first three fingers on the valve tops, and your little finger on top of the ring or in the ring. Your fingers should be curved and relaxed.

Step 3: Keep your wrists straight and tilt your instrument slightly to the right. Bring the instrument to the lips. Hold your instrument firmly but without tension. Your elbows should be away from your body.

Figure 5-12: Trumpet hand position and posture *(Photo used with permission)*[16]

Trumpet Embouchure and Mouthpiece Placement

The trumpet embouchure has one of the smallest apertures in the brass family because of the small mouthpiece. Generally, the trumpet mouthpiece will be centered horizontally and verticaly **50/50 or 60/40**. The angle of the mouthpiece/trumpet will generally tilt down slightly to form naturally to the individuals dental formation.

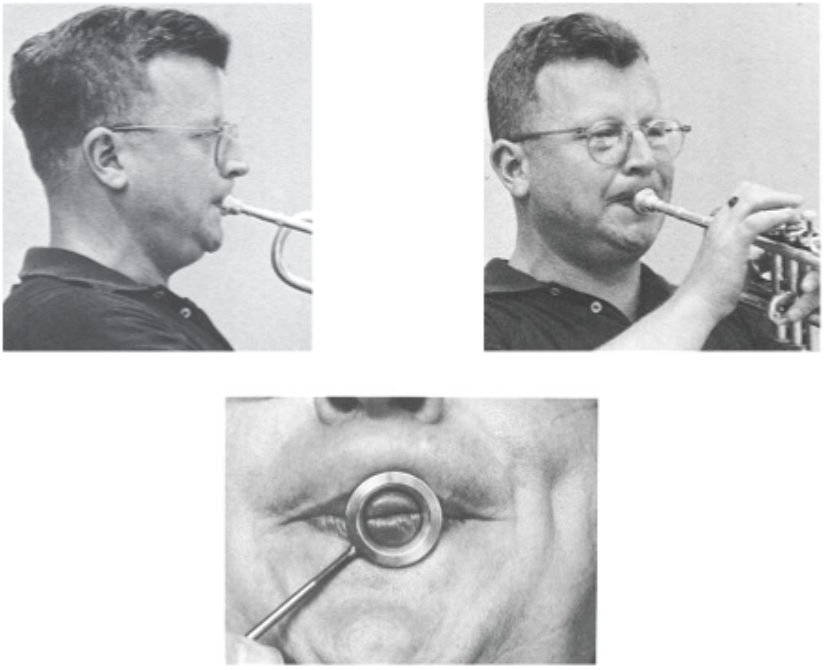


Figure 5-13: Trumpet embouchure and mouthpiece placement[17]

[16] Photo of Dr. Mark DeGoti, Professor of Trumpet at Auburn University. Reprinted with permission.

[17] Philip Farkas, *The Art of Brass Playing* (Bloomington, Indiana: Brass Publications, 1962), 26. Photos of Adolph "Bud" Herseth, former principal trumpet, Chicago Symphony Orchestra.

Trumpet Tonguing

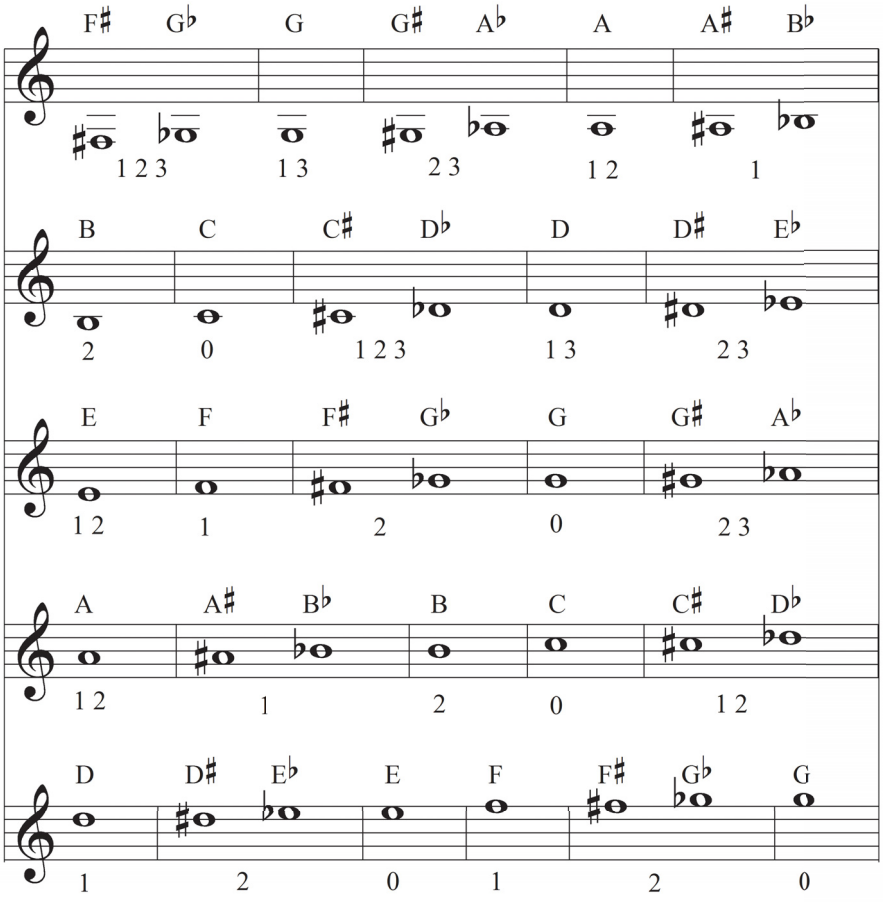
The trumpet uses the tongue to articulate the beginning of each note. The tongue acts like a valve, releasing the air stream into the instrument. There are some differing opinions about tongue placement when articulating; most teachers would agree that a trumpeter should use the tip of the tongue to touch the upper teeth along the gum line. Syllables like “too,” “toe,” “tah,” or “dah will demonstrate the proper tongue placement.

Trumpet Techniques

The following section contains trumpet reference material for teaching. Included in the section is a Bb trumpet fingering chart, harmonic series chart, and trumpet transposition chart. These charts should be memorized for teaching purposes.

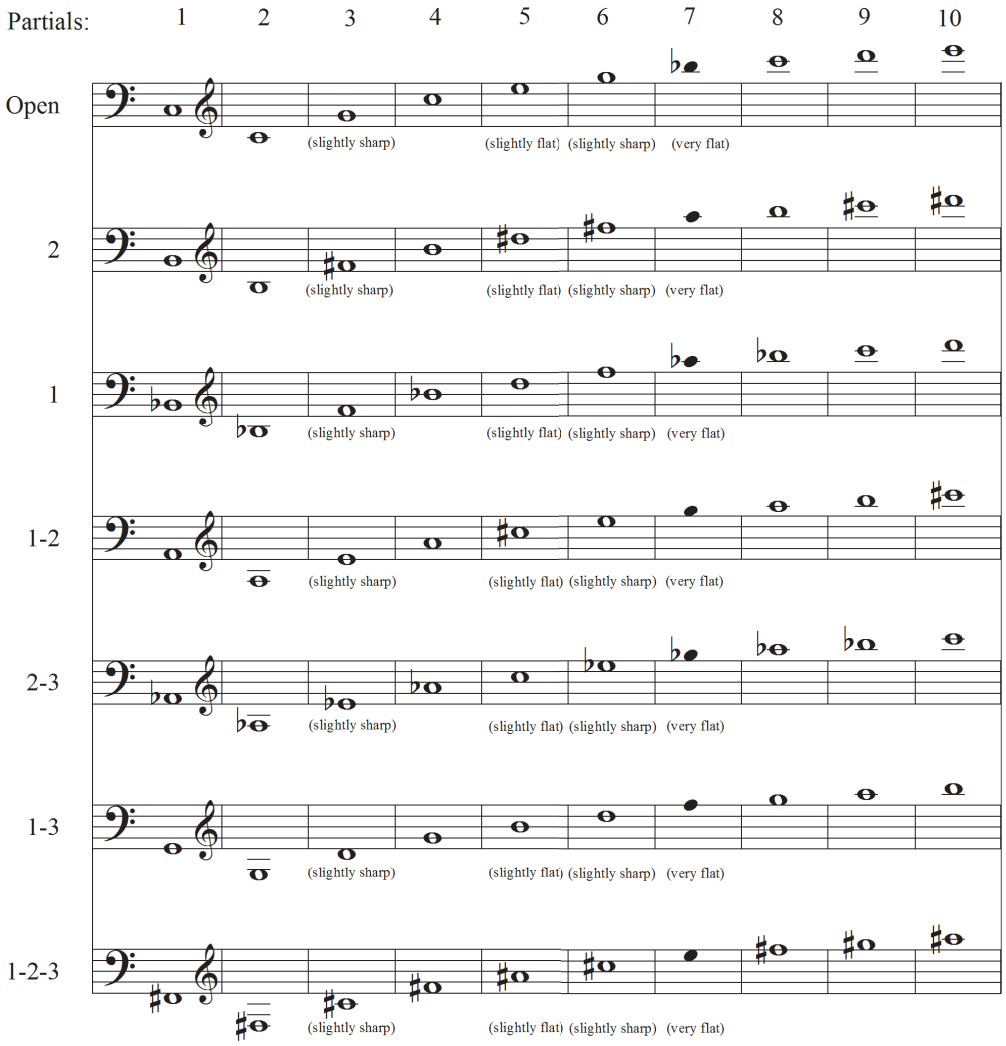
Bb Trumpet Fingerings Chart

The following is a Bb trumpet (Bb cornet) fingering chart which displays the fingerings for each note of the practical range.



Bb Trumpet Harmonic Series

The following chart displays the Bb trumpet (Bb cornet) harmonic series, which shows all of the notes that sound with specific fingering combinations. Take note of the out-of-tune partials: it is important to know these natural tendencies for tuning purposes. Notice the 7th harmonic partial is very flat and it is recommended to use an alternate fingering.



Trumpet Transpositions

It is common for trumpet players to be able to transpose in a variety of keys. This tradition dates back to the Baroque period where natural trumpet parts were written in C. To be able to play in different keys, earlier trumpeters would use "crooks" and "bits" to change the key of the trumpet. When valves were added to the trumpet, the transposing was left to the performer. This is why today the most trumpet parts are written in C and the Bb trumpet is a transposed instrument.

There are three common methods of transposition on the trumpet, the interval method, key signature adjustment method, and the clef method. It is the interval method that is one of the easiest to understand, and below is a transposition table that explains how it is understood.

Key	**Bb Trumpet**	**C Trumpet**
Bb		Major 2nd Lower
A	Minor 2nd Lower	Minor 3rd Lower
D	Major 3rd Higher	Major 2nd Higher
Eb	Perfect 4th Higher	Minor 3rd Higher
E	Augmented 4th Higher	Major 3rd Higher
F	Perfect 5th Higher	Perfect 4th Higher

Original trumpet parts in Bb, A, D, Eb, E, and F are some of the most common keys trumpet players will have to transpose.

Trumpet Equipment

In many music programs across the country, music educators are responsible for supplying good working and reliable instruments for students. The following are recommended lists that provide beginner and intermediate mouthpieces and trumpets as well as standard mutes.

Choosing a Trumpet Mouthpiece

Beginners should start with a small to medium-size mouthpiece. A more compact cup and focused rim will help the beginners' sound at the early stages of playing. As the student matures, with the help of a teacher, they should begin to experiment with bigger mouthpieces.

The following is a list of recommended trumpet mouthpieces for beginner and intermediate students. They are high-quality mouthpieces of a recognizable manufactures that are readily available. These mouthpieces will offer the student quick response in all ranges, clear articulations, easy flexibility, reliable intonation, and good endurance.

Beginner Mouthpieces

- Bach - 7C, 6C
- Yamaha - 11C4, 11C4
- Schilke - 9, 10, 11

Intermediate Mouthpieces

- Bach 5C, 3C
- Yamaha 13B4, 14C4
- Schilke 10A4, 10B4

Choosing a Trumpet

The following lists are recommended beginner and intermediate trumpet makes and models. The following are quality trumpets of recognizable manufacturers that are readily available. These trumpets have proven to play well in tune, play easily for the student, require the least amount of maintenance, and are reasonably priced.

Recommended Beginner Bb Trumpets

- Yamaha YTR 2335
- Blessing Scholastic B127
- Conn 23B "USA"
- Getzen Model 390
- Holton T602
- Amati ATR 213

Recommended Intermediate Bb Trumpets

- Bach TR200
- Yamaha YTR4335GS
- Getzen 590S Capri

Trumpet Mutes

Mutes are a vital part of the trumpet player's equipment. A mute is an appliance that is put into the bell of the trumpet and modifies the tone color or timbre of the instrument. They can be constructed from a variety of materials like cardboard, hardboard (fiber), plastic, metal (aluminum, copper, brass), and wood.[18] The varied material mutes add new dimensions to the sounds that a trumpet can make; they can make the trumpet buzz, growl, wah-wah, fuzz the sound, and even silence.

[18] The Woodwind & Brasswind, *Mutes-Brass Accessories*, 2006, http://www/wwbw.com/Mutes-Brass-Accessories1.wwbw (accessed Febuary 1, 2010).

Mutes use cork strips located on the outside that allow the mute to be gently placed inside the bell and stay in place. When placing a mute in the bell of the trumpet, first blow a puff of warm air in the bell to create a thin layer of condensation. Place the mute in the bell with a quarter turn; it will remain snugly in its place.

There are dozens of mutes available for a trumpet player, but there are really only four basic mutes that are called for on a regular basis in middle school and high school bands: the straight mute, the cup mute, the Harmon mute, and the plunger mute. It is important for a music educator to be familiar with playing properties of the basic mutes. While a mute modifies the timbre of the trumpet, it also creates inherent problems; mutes change the blowing resistance and often the overall intonation of the instrument. The following descriptions and functions of each mute will provide a comprehensive view as to their practical application. Note, many beginner players have the tendency to use less air when playing with a mute. To correct this issue, remind students that the air should be consistent, letting the mute do the "muting."

Straight Mute:

The straight mute is a standard trumpet mute. Straight mutes are the most common mutes called for by composers, and are used in orchestras, wind ensembles, jazz bands, and commercial music. If a mute is indicated in the music and a specific mute is not indicated, it should be assumed a straight mute. It may be notated in the music by: *"mute," "con sordina"* (Italian), *"mit Dämpfer"* (German), or *"avec sourdine"* (French).

Figure 5-14:
Aluminum straight mute
(Photo used with permission)

Straight mutes can be constructed of cardboard, hardboard (fiber), plastic, metal (aluminum, copper, brass), and wood. These mutes work by putting an echo chamber on the bell creating the sound of a "buzz." It is important to remember that when an entire section of trumpets is playing a muted section, they should be using the same construction of mutes, all hardboard, plastic, aluminum, etc. The mixture of material will create a discrepancy in the timbre.

Most straight mutes will tend to make the trumpet go sharp, so one must pull out the main tuning slide about one quarter of an inch to adjust for the change.

Cup Mute

The cup mute is a standard trumpet mute. Cup mutes are commonly used in jazz bands, combos, and commercial music; however, one will find on occasion the cup mute in orchestras and wind ensembles. The cup mute is very similar to a straight mute with one distinct difference: there is a large cup attached to the end of the mute. The cup creates a “fuzzy” sound, because the sound is further dampened before it is allowed to leave the bell. Music will specifically call for a cup mute, which is usually notated with the word *“cup,” cup mute,” or “sourdine bol”*(French).

Figure 5-15: Aluminum cup mute *(Photo used with permission)*

The cup mute can be constructed of cardboard, hardboard (fiber), and metal (aluminum, copper, brass). The use of the cup mute will often have an opposite effect on the pitch than the straight mute. Some cup mutes make the pitch flat, so it is a good idea to push in the main tuning slide about one quarter of an inch to adjust for the change.[19]

[19] Sherman, 1979, 121.

Harmon Mute (Wah-Wah)

Harmon mutes produce a characteristic and recognizable “Harmon” sound. A Harmon mute consists of two parts: the main body, and the stem (plunger). The mute can be used to produce a variety of tone colors by adjusting the position of the stem. The Harmon mute is commonly used in jazz and should be played without the stem unless otherwise noted. Generally the Harmon mute will be very sharp, so one must pull out the main tuning slide

Figure 5-16: Aluminum Harmon mute with pulled stem *(Photo used with permission)*

By placing the palm of your left hand over the opening and then releasing it creates a “Wah-Wah” sound. Many times in music this will be notated with a "+" over the note to indicate that it is to be played with the palm covering the plunger, and with an "o" over the note to indicate that it is to be played without the palm.

Plunger Mute:

Plunger Mutes are basically the head from a toilet plunger (preferably not used). This mute is used mainly for jazz styles. This mute is used to create a "Do-Wah" effect by notated with a "+" over the note to indicate that it is to be played with the plunger closed over the bell, and with an "o" over the note to indicate that it is to be played without the plunger.

Figure 5-17:
Hard rubber plunger
(Photo used with permission)

Other Specialty Trumpet Mutes:

"Whistpa" Mute

Also known as a practice mute, is a specialty mute that has cork completely around the end of the mute to seal it into the bell, directing all of the sound into the mute.[20] This mute produces the softest dynamic of all the mutes.

Bucket Mute

This specialty mute has two designs, first as an oversized straight mute with large holes along the side and second, a bucket with springs that clips to the rim of the bell. This mute is filled with cotton and batting that removes high frequencies and produces soft, muffled tone.

"Crown Royal" Bag

Also known as the Felt Hat, is a specialty mute that is hung or draped over the bell. This mute or bag simply dampens the sound of the performer.

[20] Roger Sherman, 1979, 123.

Trumpet Methods and Study Materials

The following lists are standard method books and study materials for private study in trumpet. This is by no means a comprehensive list. This is simply a list that contains essential material with varying degrees of technical difficult and melodious styles of music. The levels are categorized into ***skill levels*** and ***years of experience*** and do not necessarily correspond to a student's academic classification. All skill levels are based on individual judgment.

Beginner Methods (0-2 years)

- Clarke: *Elementary Studies* (C. Fischer)
- Getchell: *First Book for Practical Studies* (Balwin-Mills)
- Lillya: *Method for Trumpet or Cornet,* Vol. 1 & 2 (Balquidder)
- Ridgeon: *Brass for Beginners* (Boosey & Hawkes)
- Robinson: *Rubank Elementary Method*, Vol. 1 & 2 (Rubank)

Intermediate Methods (1-5 years)

- Arban: *Complete Conservatory Method,* ed Goldman and Smith (C. Fischer)
- Bordogni: *24 Vocalises*, trans. Porret (A. Leduc)
- Clark: *Technical Studies* (C. Fischer)
- Kopprasch: *60 Studies,* Vol. 1 & 2, ed. Gumbert and Herbst (C. Fischer)
- Longinotti: *l'Etude de la trompette* (Editions Henn)
- Saint-Jacome: *Grand Method* (C. Fischer)

Advanced Methods (4 years and up)

- Charlier: *Etudes transcendantes* (A. Leduc)
- Chavanne: *25 Characteristic Studies* (A. Leduc)
- Clark: *Character Studies* (C. Fischer)
- Vannetelbosch: *20 Melodic and Technical Studies* (A. Leduc)
- Sachse: *100 Studies* (transposition) (Selmer)

Trumpet Books, Journals, and Websites

The following are recommend books, journals, and websites dedicated to the trumpet. This is by no means a comprehensive list. This is simply a list of trumpet writings and resources of various categories of trumpet research. They represent historical, pedagogical, and analytical studies about the trumpet.

Trumpet Books

Bate, Phillip. *The Trumpet and Trombone: An Outline of Their History, Development, and Construction*, 2nd ed. New York: W.W. Norton and Company, 1978.

Booth. Matthew. *Sound the Trumpet: The John Wilbraham Method*. London: Stainer & Bell, 2000.

Campos, Frank G. *Trumpet Technique.* London: Oxford University Press, 2005.

Dale, Delbert A. *Trumpet Technique*. London: Oxford University Press, 1965.

Davidson, Louis. *Trumpet Profiles*. Bloomington, Indiana: Davidson, 1975.

Davidson, Louis. *Trumpet Techniques.* Rochester, N.Y.: Wind Music, Inc., 1970.

Farkas, Philip. *The Art of Brass Playing*. Rochester, New York: Wind Music, Inc., 1962.

Hickman, David. *Trumpet Pedagogy: A Compendium of Modern Teaching Techniques.* Chandler, Arizona: Hickman Music Editions, 2006.

Johnson, Keith. *The Art of Trumpet Playing*. Denton, TX: Gore Publishing Co., 1994

Mathie, Gordon. *Trumpet Teacher's Guide: A Bibliography of Selected and Graded Etudes*. Cincinnati, Ohio: Queen City Brass, 1984.

Sherman, Roger. *The Trumpeter's Handbook: A Comprehensive Guide to Playing and Teaching the Trumpet*. Athens, Ohio: Accura Music, 1979.

Tarr, Edward H. *The Trumpet*. Translated from the German by S.E. Plank and Edward Tarr. Portland, Oregon: Amadeus Press, 1988.

Trumpet Journals

- *International Trumpet Guild*
- *Brass Bulletin*
- *International Musician*
- *Galpin Society Journal*

Trumpet Websites

- International Trumpet Guild *www.trumpetguild.org*
- Trumpet Stuff *www.trumpetstuff.com*
- Trumpet Player *www.trumpetplayeronline.com*
- Trumpet Herald *www.trumpetherald.com*
- Trumpet Studio *www.trumpetstudio.com*
- Trumpet Geeks International *www.trumpetgeek.org*
- O.J. Trumpet Page *http://abel.hive.no/trompet/index.html*
- Bryan Goff Trumpet Tips *http://mailer.fsu.edu/~bgoff/tpt-tips/tips.html*
- Virtual Trumpet Studio *www.petrouska.com*

Chapter 6

The Horn

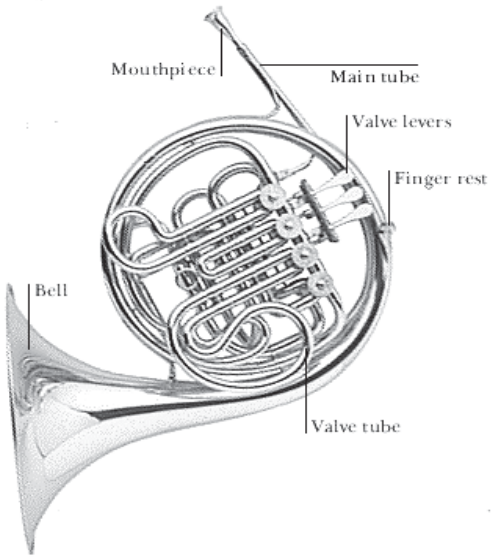


Figure 6-1: Parts of the horn *(Photo used with Permission)*[1]

The horn is a conical bore instrument and serves as the alto voice of the brass family. The horn family consists of several instruments ranging in different keys and sizes. The horns commonly made available are the following:

- Descant Horn
- Bb Single Horn
- F Single Horn
- F/Bb Double Horn
- F/Bb/F–alto Triple Horn

The F single horn is the most commonly used horn for beginners. The F horn develops a good concept of horn sound and offers a young student the advantages of mastering the fundamental horn, developing accuracy and flexibility. The F horn is

[1] David M. Grasmick, *California State Polytechnic University, Pomona*, http://www.csupomona.edu/~dmgrasmick/mu330/Hornlecture.html (accessed January 26, 2010). Reprinted with permission for educational purposes using Microsoft Musical Instruments 1994.

approximately 12 feet long (369 cm)[2] and has a written range of low F# – c3. The F horn is a transposed instrument it sounds a perfect fifth lower than written.

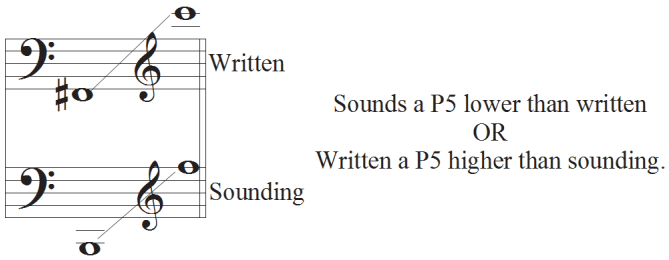


Figure 6-2: The range of the F horn[3]

Music educators should have an understanding of the practical ranges of beginning, intermediate, and advanced horn students. A student's range will vary according to the student's experience and ability. Range can be extended when the fundamentals of embouchure formation and tone production are mastered. The following chart serves only as a guide for music educators in determining range ability.

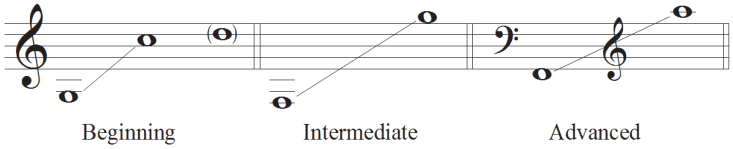


Figure 6-3: Beginning, intermediate, and advanced horn range[4]

[2] Anthony Baines, *Brass Instruments: Their History and Development*, Reprint (New York: Dover, 1980), 26.

[3] William J. Skeat, Harry F. Clarke and Russell V. Morgan, *The Fundamentals of Band Arranging* (New York: Sam Fox Publications Company, 1965), 18.

[4] Mark C. Ely and Amy E. Van Deuren, *Wind Talk for Brass* (Oxford: Oxford University Press, 2009), 260.

Modern Horns

Today's modern horns can be categorized into four types: single horn (F or Bb), double horn (F/Bb), triple horn (F/Bb/F-alto) and the descant horn (F-alto or Eb-alto). The double and triple horns would be considered the standard horn, and the single and descant horn would be considered specialty horns.

F Single Horn

Figure 6-4: Amati-AHR-321-0 F single horn student model *(Photo used with Permission)*[5]

Today's single F horns are intended specifically for beginners. It is felt that by starting on a single F horn, the student will develop a good concept of the horn tone and the fundamental elements of flexibility and accuracy on the horn will be developed.

Bb Single Horn

Figure 6-5: Yamaha YHR-322II, Bb single horn student model *(Photo used with Permission)*[6]

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[5] The Woodwind & Brasswind, *Horns*, http://www.wwbw.com/French-Horns-Brass-Instruments1,Page-1.wwbw (accessed Feburary 1, 2010). Reprinted with permission.

[6] The Woodwind & Brasswind, *Horns*, http://www.wwbw.com/French-Horns-Brass-Instruments1,Page-7.wwbw (accessed Feburary 1, 2010). Reprinted with permission.

Some horn players feel that the Bb horn offers important advantages to beginning students. Because of the more widely spaced harmonics, finding the right notes is much easier for beginning student and the ease of the response is a positive aid to tone production.

F/Bb Double Horn

Figure 6-6: Hans Hoyer DK122A, double horn with detachable bell *(Photo used with Permission)*[7]

The full double horn is a combination the F and Bb single horns into one instrument. In the full double horn configuration, the change valve routes the air column directly through either F or Bb ranks (sides) of the tubing before it renders the bell section. The inherent problem of the double horn is that it is heavier due to the extra tubing required. Although the full double horn consists of two complete horns in one, the player approaches it as one horn. Crossover points are established and the horn is considered one instrument. The full double horn is the most widely used horn today. Used by professionals, university students, and high school students, it is found in chamber ensembles, orchestras, concert bands, commercial studio orchestras, and as a solo instrument. Occasionally, the horn can be found in jazz ensembles.

[7] The Woodwind & Brasswind, *Horns*, http://www.wwbw.com/French-Horns-Brass-Instruments1,Page-2.wwbw (accessed Feburary 1, 2010). Reprinted with permission.

F/Bb/F Triple Horn

Figure 6-7: Hans Hoyer C23-L triple horn with detachable bell *(Photo used with Permission)*[8]

The triple horn is a general-purpose horn, which can be used as an alternative to the double horn. The full triple horn is constructed by lengthening the rotary valves further to accommodate three ranks of tubing. These result in a horn that incorporates three independent sections: F/Bb/F-alto (or Eb-alto or Bb soprano). Historically, the difficulty of designing a triple horn was the problem of the weight of the extra tubing. Today's leading instrument makers, through various means, are producing triple horns that weigh only slightly more than a double horn.

Descant Horn

Figure 6-8: Holton H200 descant horn with detachable bell *(Photo used with Permission)*[9]

[8] The Woodwind & Brasswind, *Horns*, http://www.wwbw.com/French-Horns-Brass-Instruments1,Page-3.wwbw (accessed Feburary 1, 2010). Reprinted with permission.

[9] The Woodwind & Brasswind, *Horns*, http://www.wwbw.com/French-Horns-Brass-Instruments1,Page-3.wwbw (accessed Feburary 1, 2010). Reprinted with permission.

The descant horn is comparable to the higher trumpets; it places the high notes lower in the harmonic series, where there is greater distance between notes of the series. Today, descant horns are a normal part of a professional horn player's equipment. They are widely used for Baroque repertoire, some Mozart and Haydn symphonies, concertos, and other works requiring the high tessitura.

Fundamental Concepts of Horn Playing

The following are fundamental concepts of horn playing. They cover beginning concepts of hand position, playing posture, embouchure, mouthpiece placement, and articulation. There are step-by-step details and photos to help guide the student.

Hand Position and Playing Posture

The horn is the only brass instrument that the valves are played by the left hand. The right hand is placed in the bell and hand placement is very important to sound quality and intonation.

Step 1: Place the left hand around the tubing by the valves. Place the left pinky finger in the finger hook and thumb in the thumb hook or thumb valve (for double horns). The three middle fingers are placed on the valves.

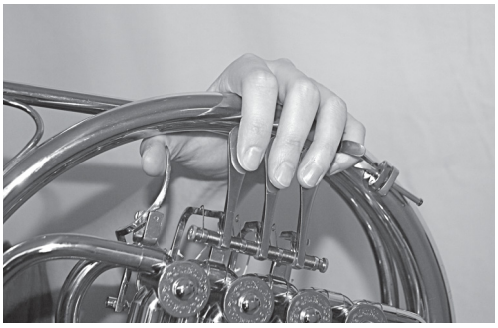


Figure 6-9: Left hand position for horn *(Original photo)*

Step 2: The right hand should be cupped as if to hold water in the palm.

Figure 6-10: Right hand shape *(Original photo)*

Step 3: Insert the right hand into to bell with the backs of the fingers and the top of the thumb touching the far side of the bell. The right hand should be a position to help support the horn.

Figure 6-11: Right hand position in bell for horn *(Original photo)*

Step 4: For beginners, the bell edge may rest on the right thigh or hip to support the horn. Bring the instrument to the lips and lower it into a comfortable position. Hold the horn firm but without tension. Avoid distorting the head, neck, and upper body position.

Horn Embouchure and Mouthpiece Placement

Like the trumpet embouchure, the horn embouchure has one of the smallest apertures in the brass family because of the small mouthpiece. Many professionals feel the horn mouthpiece will generally be centered horizontally, but vertically the placement should be **60/40**. The 60% upper lip to 40% lower lip ratio will help with the tone production and overall flexabilty needed when playing horn. The angle of the mouthpiece/horn will generally tilt down slightly to form naturally to the individual's dental formation. The goal of mouthpiece placement is to create the best position to promote pitch-vibration.

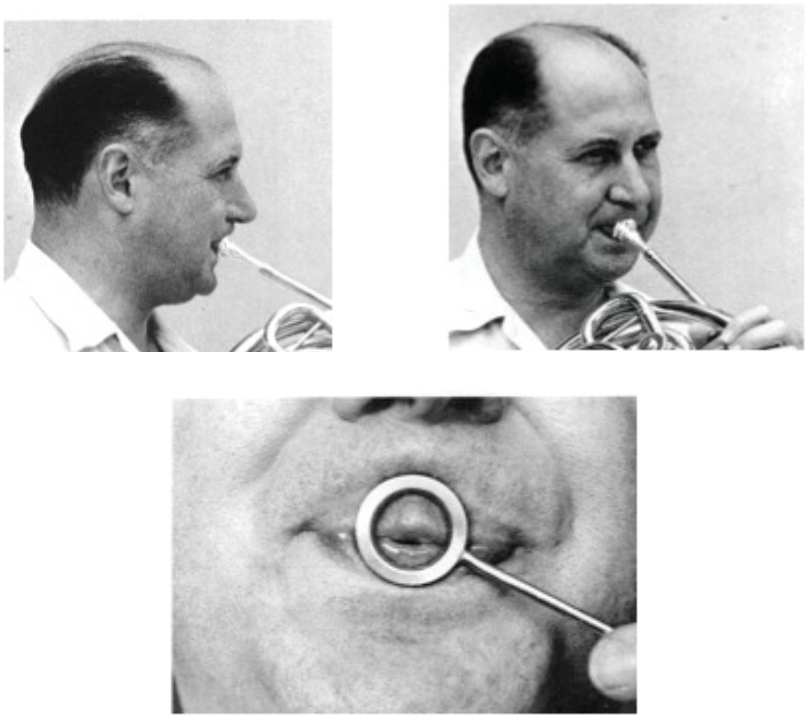


Figure 6-12: Horn embouchure and mouthpiece placement [10]

Horn Tonguing

The horn, like all brass instruments, uses the tongue to articulate the beginning of each note. Tonguing is an individual matter depending on the formation of the teeth and jaw. The thickness and length of the tongue and the size of the oral cavity contribute to articulating with the tongue. There are some differing opinions about tongue placement when articulating on horn. Some teachers feel that a hornist should use the tip of the tongue to touch the upper teeth along the gum line. Syllables like "too," "toe," or "tah" will demonstrate the proper tongue placement. Other teachers instruct to tongue slightly between the teeth, as if to "spit" a piece of hair off the tip of the tongue. It is best to experiment with the different approaches to find the best methods for your students.

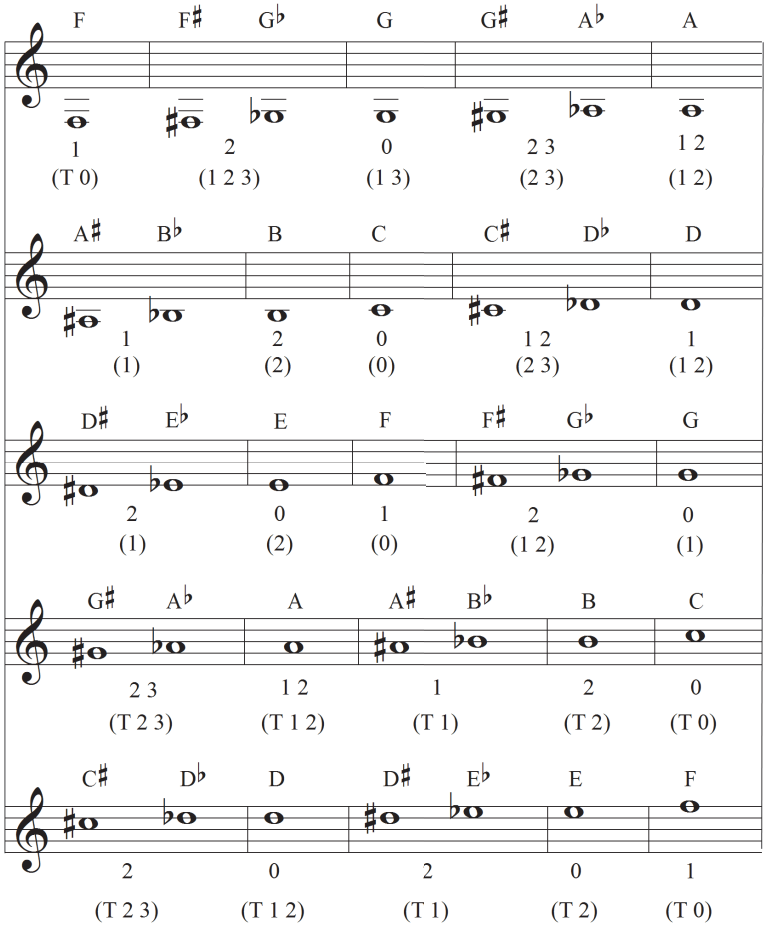
[10] Philip Farkas, *The Art of Brass Playing* (Bloomington, Indiana: Brass Publications, 1962), 29. Photo of Philip Farkas, former principal horn, Chicago Symphony Orchestra.

Horn Techniques

The following section contains horn reference materials for teaching. Included in the section are a F/Bb fingering chart, F horn and Bb horn harmonic series charts, and a horn transposition chart. These charts should be memorized for teaching purposes.

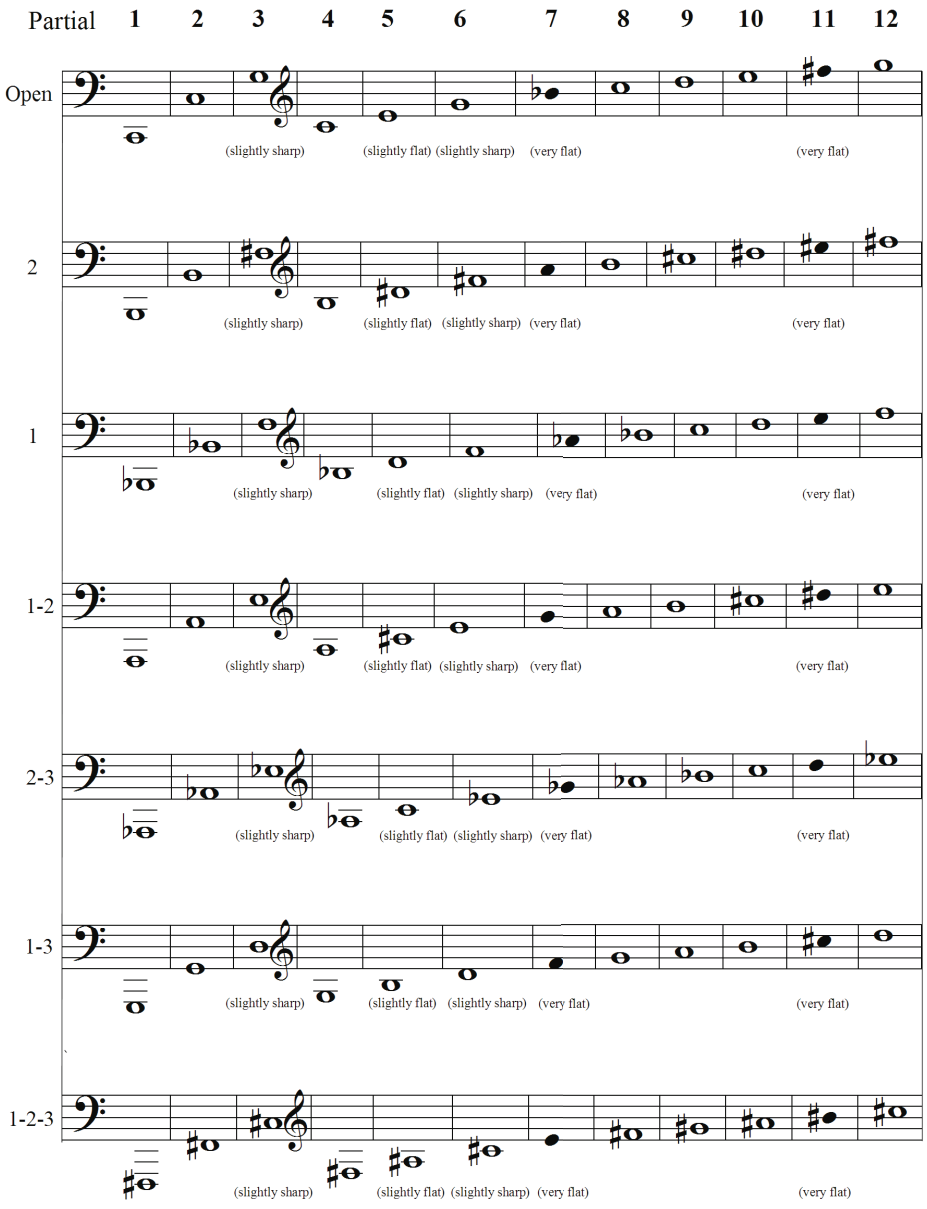
Horn Fingering Chart

The following chart displays the F Horn, Bb Horn, and Double Horn fingerings for each note of the practical range. The upper fingerings are for the F horn and the lower fingerings in parenthesis are for the Bb horns. The Double Horns can use the Bb Horn fingerings by depressing the thumb valve indicated with a "T" before the fingering. Usually, starting with G#[1] on the staff on up the scale uses the Bb fingerings.



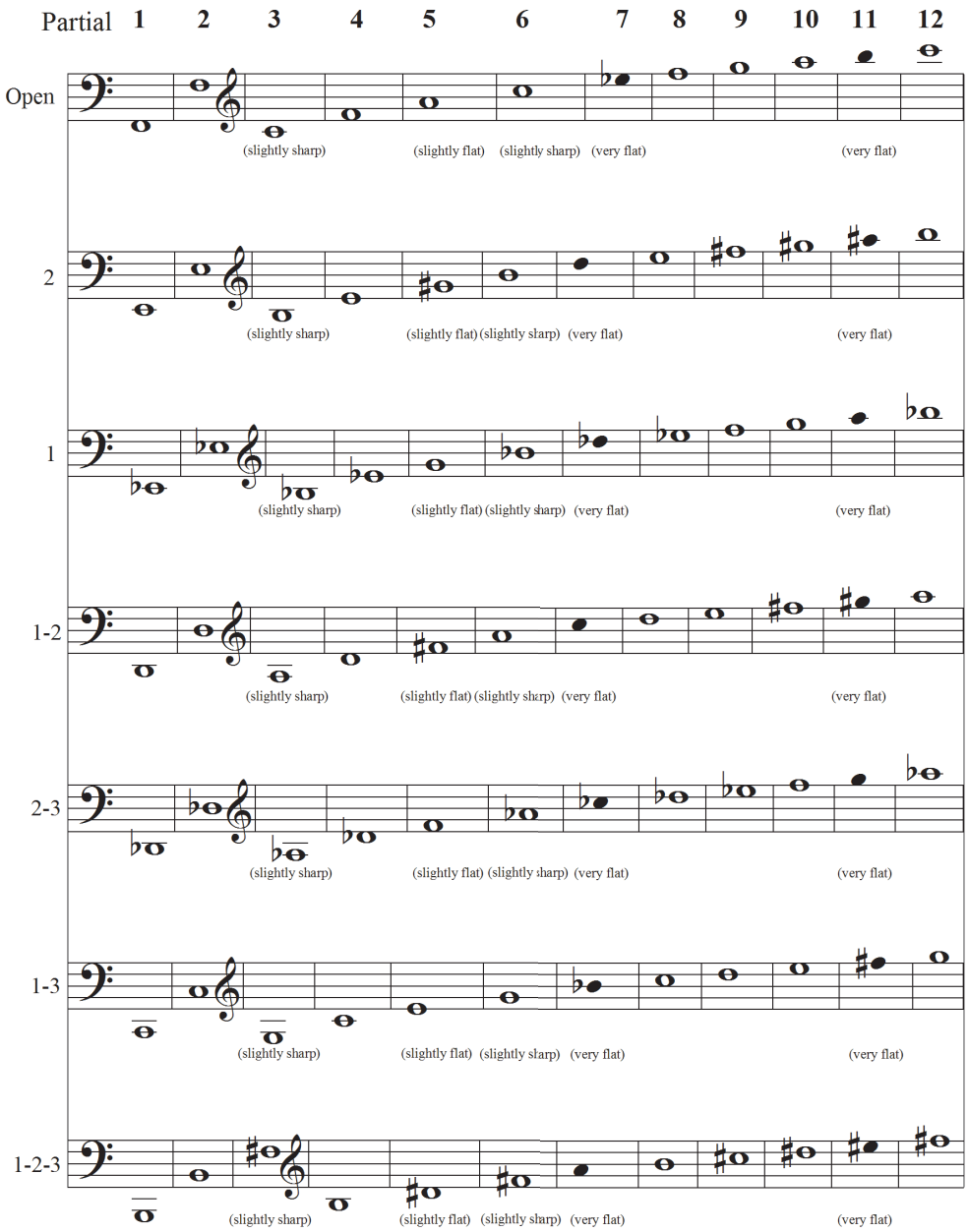
F Horn Harmonic Series

The following chart is the F Horn harmonic series and shows all of the notes that sound with specific fingering combinations. Take note of the out-of-tune partials. It is important to know these natural tendencies for tuning purposes. Notice the 7th and 11th harmonic partials are very flat and it is recommended to use alternate fingerings.



Bb Horn Harmonic Series

The following chart is the Bb Horn harmonic series and shows all of the notes that sound with specific fingering combinations.



Horn Transpositions

It is common for horn players to be able to transpose in a variety of keys. This tradition dates back to the Baroque period where natural horn parts were written in C and to play in different keys, horn players would use would use "crooks" and "bits" to change the key of the horn. When valves were added to the horn, transposing was left to the performer. This is why today the horn parts are written in F horn, and it is a transposed instrument.

There are three common methods of transposition on the horn, the interval method, key signature adjustment method, and the clef method. It is the interval method that is one of the easiest to understand and below is a transposition table that explains how it is understood.

Key	**Interval Method**	**Clef Method**
Bb	Perfect 5th lower	Mezzo-soprano clef
C	Perfect 4th lower	
D	Minor 3rd	
Eb	Major 2nd lower	Tenor Clef
E	Minor 2nd lower	Tenor Clef
G	Major 2nd higher	Alto Clef
A	Major 3rd higher	Bass Clef

Horn Equipment

In many music programs across the country, music educators are responsible for supplying good working and reliable instruments for students. The following are recommended lists that provide beginner and intermediate mouthpieces and horns, as well as standard mutes.

Choosing a Horn Mouthpiece

Beginners should start with a small to medium-size mouthpiece. A more compact cup and focused rim will help center the sound at the early stages of playing. As the student matures, with the help of a teacher, they should begin to experiment with bigger mouthpieces.

The following is a list of recommended horn mouthpieces for beginner and intermediate students. These are high-quality mouthpieces of recognizable manufactures that are readily available, and will offer the student quick response in all ranges, clear articulations, easy flexibility, reliable intonation, and good endurance.

Beginner Mouthpieces

- Yamaha – 29D4, 30C4
- Denis Wick 7, 7N
- Schilke – 27, 28, 29, 30
- Bach – 12, 15, 18

Intermediate/Advanced Mouthpieces

- Yamaha – 30C4, 31D4, 32C4
- Denis Wick – 6N, 5N
- Schilke – 30, 31B, 31C2
- Bach – 3, 7, 10

Choosing a Horn

In many music programs across the country, music educators are responsible for supplying good working and reliable instruments for the students. The single F horn is exclusively used as a beginner horn, and the double horn can be both a beginning and intermediate/advanced horn. Some band programs begin students on single Bb horns. Educators feel that it is easier to produce correct pitch that matches the other Bb instruments. The argument against this method is that the beginner horn student will have a more difficult time developing a characteristic tone quality and the fundamental elements of flexibility and accuracy on the F horn.

The following lists are recommended beginner and intermediate horn makes and models. These are quality horns of recognizable manufacturers that are readily available, and have proven to play well in tune, as well as playing easily for the student. They require the least amount of maintenance, and are reasonably priced. The lists also specify if the horn is a single or double horn.

Recommended Beginner Horns

- Conn 14D (Single)
- Yamaha YHR-314II (Single)
- Barrington BRG 103 (Single)
- Amati AHR 343 (Double)

Recommended Intermediate Horns

- Conn 8D (Double)
- Holton Farkas H179 (Double)
- Holton Merker Metic (Double)
- Yamaha YHR 567 (Double)

Stopped Horn and Muted Horn

The theory behind hand stopping and stopped horn muting can be a controversial subject. Much of the controversy is around when to use the hand vs. mute for stopped horn. For many beginners, their hands are generally too small to get a good seal for hand stopping. Some professionals advocate that beginners use a stopped horn mute for all stopped passages, while others attempt to teach beginners the hand-stopped technique. Various aspects of this subject can be studied in pedagogical books like *The Art of French Horn Playing* by Philip Farkas, *The Horn* by Robin Gregory, and *The French Horn* by R. Morley-Pegge. The following section will demonstrate both approaches.

The "stopped" effect is simply sealing the horn bell to create a compressed, brassy sound. Stopped horn is indicated in the music with a + above or below the note. There are two methods of stopped horn: hand stopped and mute stopped.

The theory of a fully stopped note on the horn *raises* the pitch a m2 (or ½ step), requiring the performer to finger pitches a minor 2 (or ½ step) lower than the written pitch on the F horn. The chart below illustrates how to perform stopped horn.

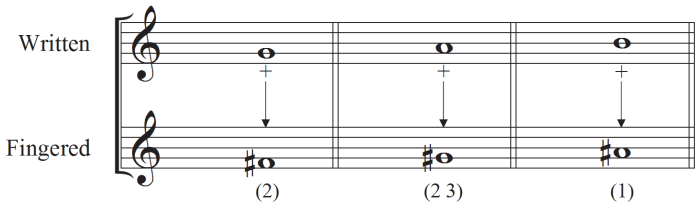
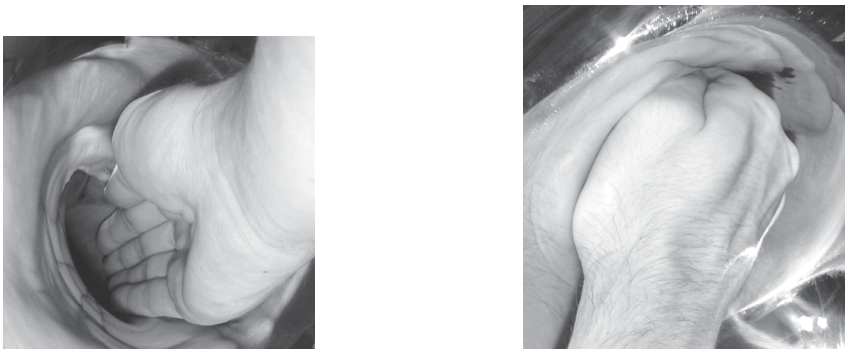


Figure 6-13: Stopped horn example

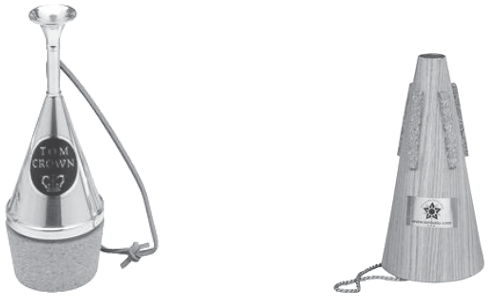
Hand stopped is made by using the hand to seal the bell. The performer must bring the palm of the hand around to close off the opening.



(A) (B)

Figure 6-14: (A) Open hand position and (B) stopped hand position *(Original photo)*

Stop mutes were created as a substitute for hand stopping. Stop mutes are transposing mutes and will require the performer to finger pitches m2 (or ½ step) lower than the written pitch on the F horn.



(A) (B)

Figure 6-15: (A) Stop mute and (B) straight mute *(Photo used with permission)*

Straight muting for the horn is the same as for any other brass instrument. Straight mutes are non-transposing mutes made by a number of manufactures. Straight mutes can be constructed of cardboard, hardboard (fiber), plastic, metal (aluminum, copper, brass), and wood. It is important to remember that when an entire section of horns are playing a muted section they should be using the same construction of mutes, all hardboard, plastic, aluminum, etc. The mixture of material will create a discrepancy in the timbre.

Horn Methods and Study Materials

The following lists are standard method books and study materials for private study in horn. This is by no means a comprehensive list. This is simply a list that contains essential material with varying degrees of technical difficulty and melodious styles of music. The levels are categorized into ***skill levels*** and ***years of experience*** and do not necessarily correspond to a student's academic classification. All skill levels are based on individual judgment.

Beginner Methods (0-2 years)

- Clevenger, McDunn, and Rusch: *Dale Clevenger Method,* Vol. 1 & 2 (Kjos)
- Freund: *French Horn Method for the Young Beginner,* Vol. 1, 2, & 3 (Doblinger)
- Hauser: *Foundations to Horn Playing* (C. Fischer)
- Howe: *Method* (Marvin C. Howe)
- Skornicka: *Rubank Elementary Method*, Vol. 1 & 2 (Rubank)
- Tuckwell: *50 First Studies* (Oxford)
- Williams: *Enjoy Playing the Horn* (Oxford)

Intermediate Methods (1-5 years)

- Gallay: *22 Studies* and *24 Studies* (International)
- Gower and Voxman: *Rubank Advanced Method,* Vol 1 & 2 (Rubank)
- Kopprasch: *60 Studies,* Vol. 1 & 2 (C. Fischer)
- Mueller: *34 Studies,* Vol. 1 & 2 (International)
- Schantl: *Grand Theoretical and Practical Method* (Wind Music)

Advanced Methods (4 years and up)

- Cugnot: *30 Etudes* (Wind Music)
- Gallay: *12 Grand Caprices* (International)
- Kling: *40 Studies* (International)
- Maxime-Alphonse: *Etudes nouvelles,* 3-6 vols. (A. Leduc)
- Pottag and Andraud: *Selected Melodies, Progressive, and Technical Studies,* 2 vols (Southern)
- F. Strauss: *17 Concert Studies* (Eulenburg)

Horn Books, Journals, and Websites

The following are recommended books, journals, and websites about the horn. This is by no means a comprehensive list. This is simply a list of horn writings and resources of various categories of horn research. They represent historical, pedagogical, and analytical studies on the horn.

Horn Books

Bushouse, David. *Practical Hints on Playing the Horn*. Melville, N.Y.: Belwin-Mills, 1983.

Cousins, Farquharson. *On Playing the Horn*. London: Samski Press (distributed by Paxman Musical Instruments), 1983.

Farkas, Philip. *The Art of Horn Playing*. Evanston, Ill: Summary-Birchard, 1956.

Gregory, Robin. *The Horn*. London: Faber& Faber, 1969.

Hill, Douglas. *Collected Thoughts on Teaching and Learning, Creativity, and Horn Performance*. Miami, Fla.: Warner Bros. Publications, 2001.

Janetzky, Kurt, and Bernhard Bruchle. *The Horn*. Portland, Ore.: Amadeus Press, 1988.

Morley-Pegge, Reginald. *The French Horn*. London: Ernest Benn, 1973.

Reynolds, Verne. *The Horn Handbook*. Portland, Ore.: Amadeus Press, 1997.

Schuller, Gunther. *Horn Technique*, 2nd ed. London: Oxford University Press, 1992.

Stewart, Dee. Philip Farkas: *The Legacy of a Master*, Northfield, Ill.: The Instrumentalist Co., 1990.

Tuckwell, Barry. *Horn*. New York: Schirmer Books, 1983.

Tuckwell, Barry. *Playing the Horn*. London: Oxford University Press, 1978.

Wekre, Froydis Ree. *Thoughts on Playing the Horn Well*. Oslo: Froydis Ree Wekre, 1994.

Horn Journals:

- *The International Horn Society*
- *The British Horn Society*
- *Historical Brass Society*
- *The Horn Call*

Horn Websites:

- The French Horn *www.thefrenchhorn.net*
- The International Horn Society *www.hornsociety.org*
- The Horn Planet *www.hornplanet.com*
- Horn Matters *www.hornmatters.com*
- Natural Horns *www.seraphinoff.com*
- Brass Resources *www.whc.net/rjones/brassrsc.html*
- Horn Excerpts *hornexcerpts.org*

Chapter 7

The Trombone

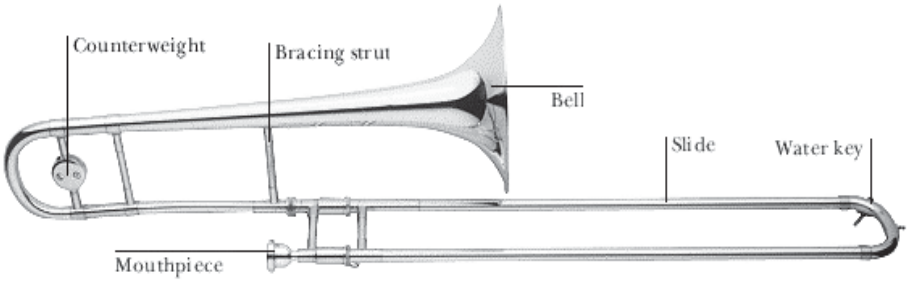


Figure 7-1: Parts of the trombone *(Photo used with permission)*[1]

The trombone is a cylindrical bore instrument and serves as the tenor voice of the brass family. The trombone family consists of several instruments ranging in different keys and bore sizes. The trombones commonly made available are the following:

- Eb Alto Trombone
- Bb Small-Bore Tenor Trombone
- Bb Medium-Bore Tenor Trombone
- Bb Large-Bore Tenor Trombone with F attachment
- Bb/D (Eb) Bass Trombone
- Bb Valve Trombone

The Bb medium-bore trombone is the most commonly used trombone for beginners. A medium-bore trombone offers the beginning student a more compact and focused sound with a well-balanced response in the upper and lower registers. The length of the Bb trombone is approximately 9 feet long (270 cm)[2] and has a written range of low E – b-flat1.[3]

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[1] David M. Grasmick, *California State Polytechnic University, Pomona*, http://www.csupomona.edu/~dmgrasmick/mu330/Tromboneelecture.html (accessed January 26, 2010). Reprinted with permission for educational purposes using Microsoft Musical Instruments 1994.

[2] Anthony Baines, *Brass Instruments: Their History and Development*, Reprint (New York: Dover, 1980), 26.

[3] William J. Skeat, Harry F. Clarke and Russell V. Morgan, *The Fundamentals of Band Arranging* (New York: Sam Fox Publications Company, 1965), 19.

All trombones are non-transposing instruments; their written pitches are the same as their sounding pitches.

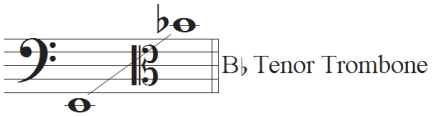

Figure 7-2: Range of Bb tenor trombone (without F attachment)

Trombones with an F attachment (trigger) extend the written range to low Bb – b-flat1.

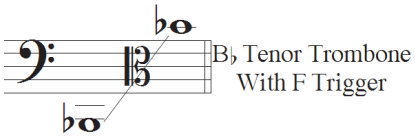

Figure 7-3: Range of the Bb tenor trombone with F attachment

Music educators should have an understanding of the practical ranges of beginning, intermediate, and advanced trombone students. A student's range will vary according to the student's experience and ability. Range can be extended when the fundamentals of embouchure formation and tone production are mastered. The following chart serves only as a guide for music educators in determining range ability.

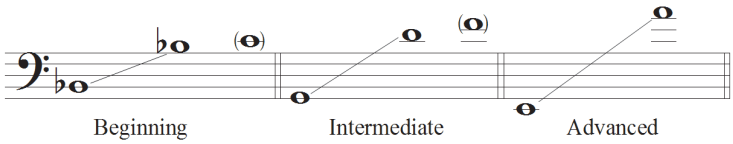

Figure 7-4: Beginning, intermediate, and advanced trombone (without F attachment) [4]

[4] Mark C. Ely and Amy E. Van Deuren, *Wind Talk for Brass* (Oxford: Oxford University Press, 2009), 338.

Modern Trombones

Today's modern trombones are categorized by the different bore sizes. It is from these innovations during the twentieth century that trombonists can now not only specify bore size and finish, but also specify different valves for the F attachment, interchangeable bells and leadpipes, and slides. Present-day performers have many choices in selecting a trombone.

The Small-bore Tenor Trombone

Figure 7-5: Bach 16 Stradivarius trombone *(Photo used with permission)*[5]

Pitched in Bb, the tenor trombone small-bore size is typically .468"-.490". They have the brightest sound and are often preferred in jazz groups. Its small bore allows performers to play extremely high and project easily in a big band or rock and roll horn section when soloing. The small-bore tenor trombone is sometimes referred to as a "pea-shooter."

The Medium-bore Tenor Trombones

Figure 7-6: Bach 36 Stradivarius trombone *(Photo used with permission)*[6]

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[5] The Woodwind & Brasswind, *Trombone*, 2006, http://www.wwbw.com/Bach,Tenor-Trombones-Trombones,page-1.wwbw (accessed March 6, 2010). Reprinted with permission.

[6] The Woodwind & Brasswind, *Trombone*, 2006, http://www.wwbw.com/Bach,Tenor-Trombones-Trombones,Page-2.wwbw (accessed March 6, 2010). Reprinted with permission.

Pitched in Bb, the tenor trombone medium-bore size is typically .500"-.525". As bore size increases, the timbre of the horn becomes "rounder or darker," less brilliant than the small-bore tenor trombone. The medium-bore trombone is also the standard beginning trombone; it offers a young student the opportunity to master the fundamentals; particularly the concept of sound, slide accuracy, and flexibility.

Medium large-bore Tenor Trombone with F attachment

Figure 7-7: Bach 49B Stradivarius trombone with traditional wrap *(Photo used with permission)*[7]

Figure 7-8: Bach 49B Stradivarius trombone with open wrap *(Photo used with permission)*[8]

Pitched in Bb, tenor trombone medium large-bore size is typically .525." The F attachment adds a wrap of tubing activated by a trigger, and a rotor valve lowers the fundamental pitch from Bb to F. This allows the player to reach lower notes that would otherwise be impossible. Trombones of this size and larger, are available in "traditional" or "open" wraps. The "open wrap" eliminates the tight turns of the traditional wrap, improving airflow through the F tubing, and is preferred by many professionals.

[7] The Woodwind & Brasswind, *Trombone*, 2006, http://www.wwbw.com/Bach,Tenor-Trombones-Trombones,Page-2.wwbw (accessed March 6, 2010). Reprinted with permission.

[8] The Woodwind & Brasswind, *Trombone*, 2006, http://www.wwbw.com/Bach,Tenor-Trombones-Trombones.wwbw (accessed March 6, 2010). Reprinted with permission.

Large-Bore Tenor with Thayer F valve

Figure 7-9: Bach Stradivarius Symphonic Gold trombone *(Photo used with permission)*[9]

Pitched in Bb, the tenor trombone large-bore size is typically .547-.555." This sized trombone is sought after in orchestral and band settings. The large-bore trombones produce darker tone qualities and an evenness of timbre through the entire dynamic range.[10] The Thayer Axial-Flow valve is an F attachment that was designed to keep the airflow constant as the F attachment is used, improving tone quality and response.

The Bass Trombone

Figure 7-10: Bach 50B3 Stradivarius bass trombone *(Photo used with permission)* [11]

Pitched in Bb, the bass trombone's largest bore measures typically .562" and has the largest bell (10-10.5"). Although there are single-rotor bass trombones, many now include a second valve, which can work independently of the first or may be "dependent" and used in combination with the first. The extra valve allows more pitch changing and

[9] The Woodwind & Brasswind, *Trombone*, 2006, http://www.wwbw.com/Bach,Tenor-Trombones-Trombones.wwbw (accessed March 6, 2010). Reprinted with permission.

[10] Edward Kleinhammer, *The Art of Trombone Playing* (Miami, FL: Summy-Birchard, 1963), 36.

[11] The Woodwind & Brasswind, *Bass Trombone*, 2006, http://www.wwbw.com/Bass-Trombones-Trombones.wwbw (accessed March 6, 2010). Reprinted with permission.

flexibility to the professional player. The bass trombone fills the gap between the tenor trombone and the tuba. Usually the bass trombone has one or two attachments, F-attachment, F and Eb-attachments, or F and D-attachments.[12] The bass trombone is used in every medium of music: symphony orchestras, concert bands, and jazz bands.

The Valve Trombone

Figure 7-11: Bach V16 Stradivarius valve trombone *(Photo used with permission)* [13]

Pitched in Bb, this model is typical of most valve trombones found today. They usually have a small to medium bore and the valve fingering is the same as euphonium. Many are sold with a conventional slide section as well for the player who wants both options, called a "super-bone." Not used in orchestras or most bands, the valve trombone is popular in some jazz ensembles and also sometimes used in marching band for trumpet and euphonium players who want to "double" on trombone.

The Alto Trombone

Figure 7-12: Bach LT39G Stradivarius alto trombone *(Photo used with permission)* [14]

[12] Kleinhammer, 1963, 2.

[13] The Woodwind & Brasswind, *Bass Trombone*, 2006, http://www.wwbw.com/Valve-Trombones-Trombones.wwbw (accessed March 6, 2010). Reprinted with permission.

[14] The Woodwind & Brasswind, *Alto Trombones*, 2006, http://www.wwbw.com/Alto-Trombones-Trombones.wwbw (accessed March 6, 2010). Reprinted with permission.

Pitched in Eb, the alto trombone is used today in solo playing and for orchestral parts requiring high tessitura and lighter tone quality. The alto trombone is considered a specialty trombone. Smaller than the tenor trombone, the alto trombone is primarily used in works of the early 19th century like Beethoven and Brahms. Today, when the alto trombone is used with an orchestral trombone section, smaller-bore instruments accompany the alto trombone to assist a blend of tone.

Fundamental Concepts of Trombone Playing

The following are fundamental concepts of trombone playing. They cover the beginning concepts of assembly, hand position, playing posture, embouchure, mouthpiece placement, and articulation. There are step-by-step details and photos to help guide the student.

Trombone Assembly

The trombone is really the only brass instrument that requires assembly. The following will explain step-by-step instructions for assembling.

Step 1: Remove the slide from the case, and hold the slide section with the "U" on the floor. Have the taller threaded section to the left (see diagram A).

Step 2: Remove the bell portion from the case and insert the small tube into the taller treaded section of the slide (see diagram B).

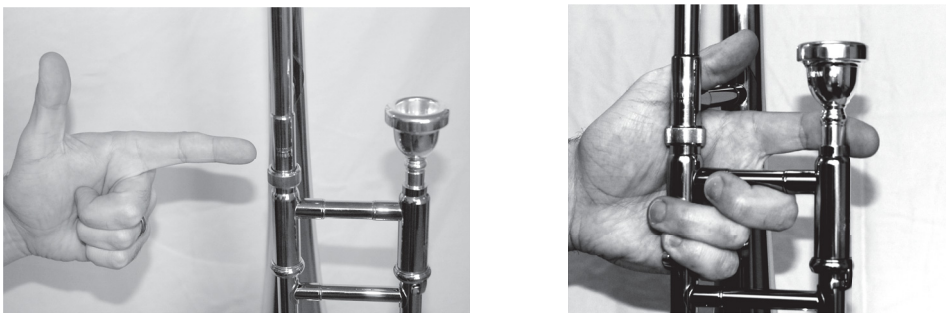
Step 3: Form a 90 degree angle between the two sections and tighten the nut (see diagram C). This section of the trombone can be adjusted to accommodate smaller hands.

(A) (B) (C)

Figure 7-13: Trombone assembly *(Orignal photos)*

Hand Position and Playing Posture

Step 1: Form the left hand in the shape of a "squirt gun" (see diagram A). Slide the left thumb around the bell brace with the forefinger over the mouthpiece, and wrap the fingers around the slide brace (see diagram B).



(A) (B)

Figure 7-14: Right hand formation *(Original photos)*

Step 2: The right hand should grasp the outer slide brace between the thumb and forefinger, like holding a "tea cup." The palm will will face inward towrd the performer.

Figure 7-15: Right and left hand position for trombone *(Original photo)*

Trombone Embouchure and Mouthpiece Placement

The trombone embouchure is larger than the trumpet and horn embouchure. The trombone mouthpiece is bigger, therefore the aperture must be larger. Generally, the trombone mouthpiece will be centered horizontally and the approximate vertical placement is usually **60/40 or 50/50**. The angle of the mouthpiece/trombone, like the trumpet and horn, will generally tilt down slightly.

Figure 7-16: Trombone embouchure and mouthpiece placement[15]

Trombone Tonguing

The trombone, like all brass instruments, uses the tongue to articulate the beginning of each note. Tonguing is an individual matter depending on the formation of the teeth and jaw. The thickness and length of the tongue and the size of the oral cavity contribute to articulating with the tongue. Like the horn, there are some differing opinions about tongue placement when articulating on trombone. Some teachers feel that a trombonist should use the tip of the tongue to touch the upper teeth along the gum line. Syllables like "too," "toe," or "tah" will demonstrate the proper tongue placement. Other teachers instruct to tongue slightly between the teeth, as if to "spit" a piece of hair off the tip of the tongue. It is important to experiment with the different approaches to find the best methods for your students.

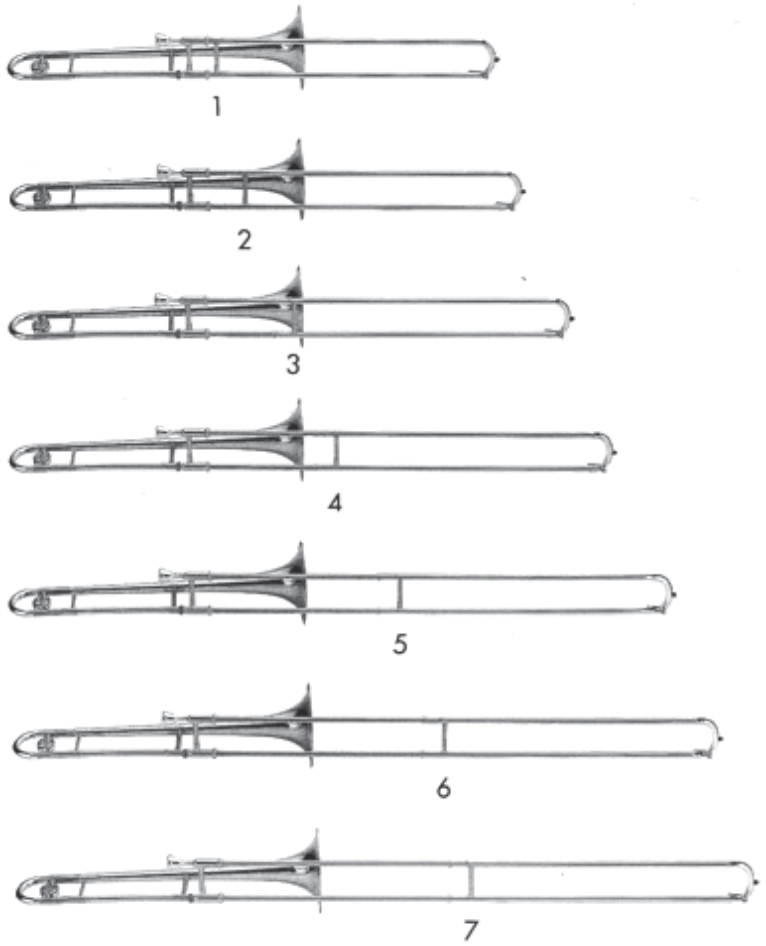
[15] Philip Farkas, *The Art of Brass Playing* (Bloomington, Indiana: Brass Publications, 1962), 30. Photos of Robert Lambert, former principal trombone, Chicago Symphony Orchestra.

Trombone Techniques

The following section contains trombone reference material for teaching. Included in the section are a trombone slide position graph, trombone slide position chart, and harmonic series chart. These charts should be memorized for teaching purposes.

Trombone Slide Position Graph[16]

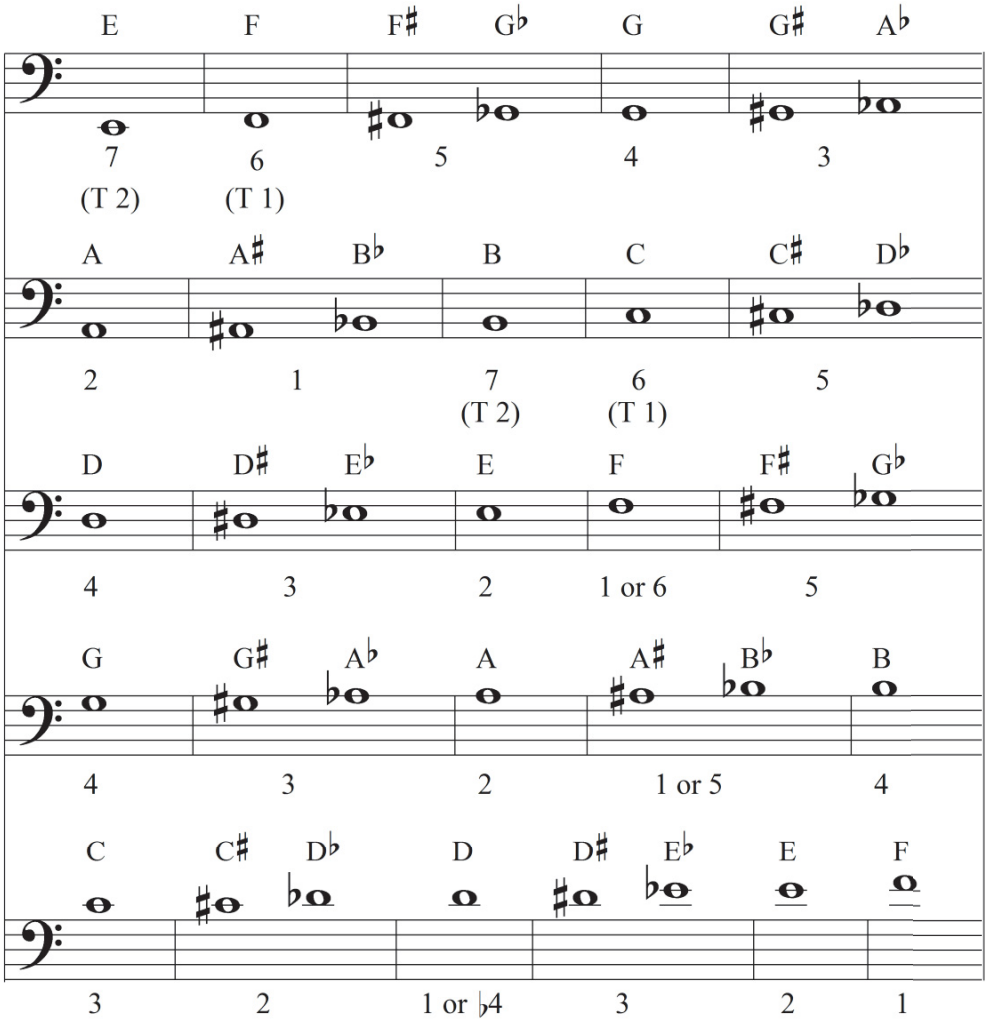
The following chart shows the *approximate* placement for each slide position. Each trombone plays differently, some notes may tend to play flat or sharp. One may need to adjust slightly from the chart positions to play these notes in tune.



[16] Tom C. Rhodes, Donald Bierschenk and Tim Lautzenheiser, *Essential Elements: A Comprehensive Band Method* (Milwaukee, WI: Hal Leonard Publishing Corporation, 1991), 284.

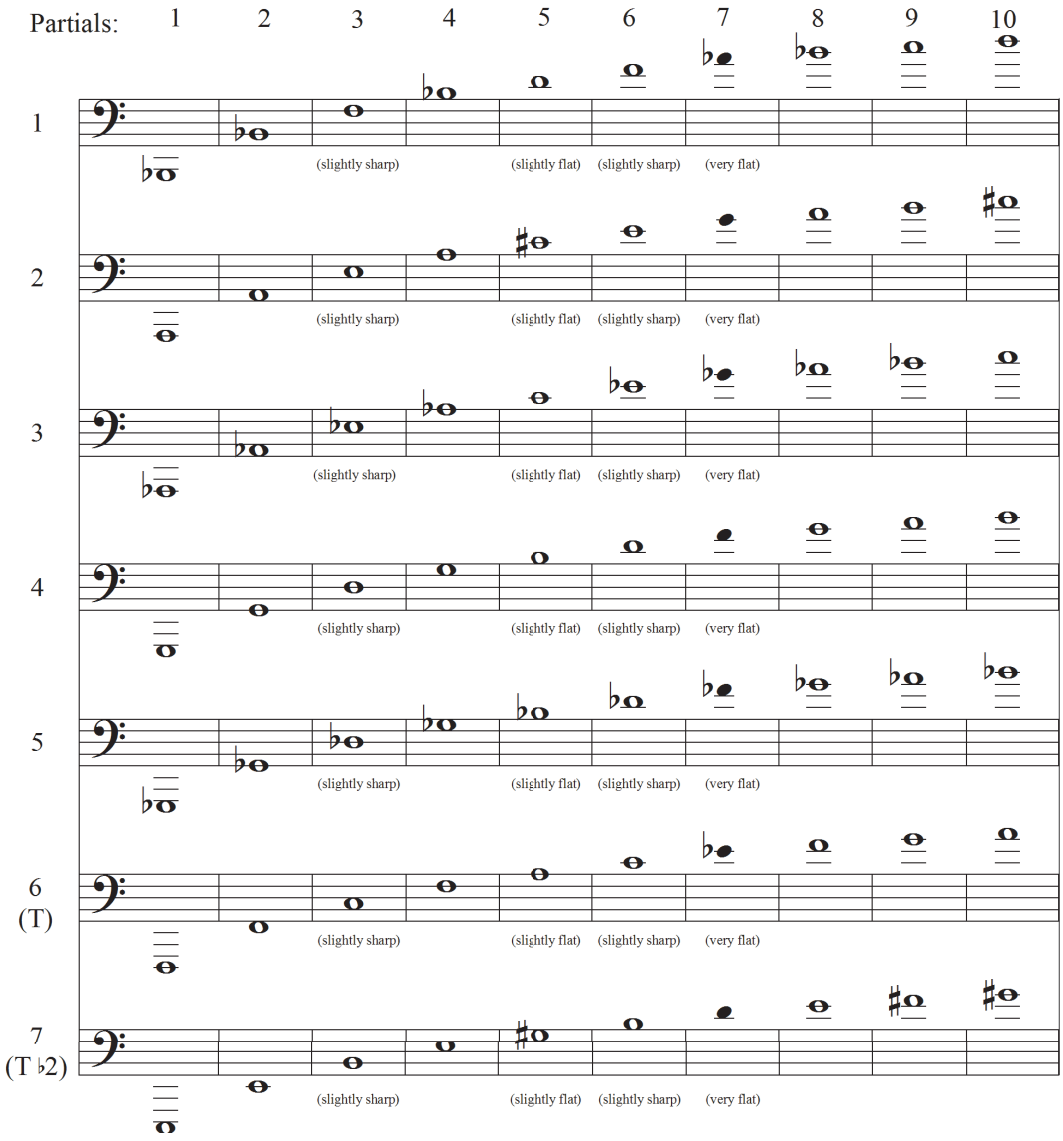
Trombone Slide Position Chart

The following chart displays the trombone slide positions and alternate positions for each note of the practical range. Trombones with F attachments may use the alternate positions in parentheses by depressing the thumb valve indicated with a “T” before the position.



Trombone Harmonic Series

The following chart is the trombone harmonic series and shows all of the notes that sound with specific slide positions. Take note of the out-of-tune partials. It is important to know these natural tendencies for tuning purposes and it is recommended for the student to move the slide slightly up or down to adjust. Notice the 7th harmonic partials are very flat and it is recommended to use an alternate position.



Trombone Equipment

Music educators are responsible for supplying good working and reliable instruments for students. The following are recommended lists that provide beginner and intermediate mouthpieces and trombones, as well as standard trombone mutes.

Choosing a Trombone Mouthpiece

Beginners should start with a small to medium-size mouthpiece. A more compact cup and focused rim will help center the sound at the early stages of playing. As students mature, with the help of a teacher, they should begin to experiment with bigger mouthpieces.

The following is a list of recommended trombone mouthpieces for beginner and intermediate/advanced students. These are high-quality mouthpieces of recognizable manufactures that are readily available, and provide the student quick response in all ranges, clear articulations, easy flexibility, reliable intonation, and good endurance.

Trombone mouthpieces are made for large and small shanks. It is necessary to know whether the trombone's leadpipe is designed for a large or small shank before purchasing mouthpieces.

Beginner Mouthpieces

- Bach – 12C, 12, 11
- Denis Wick – 12BS
- Schilke – 46, 47

Intermediate/Advanced Mouthpieces

- Bach – 6½ AL, 7, 7C
- Denis Wick – BS6
- Schlike – 50, 51, 51B

Choosing a Trombone

In many music programs across the country, music educators are responsible for supplying good working and reliable instruments for the students. The following lists are recommended beginner and intermediate trombone makes and models. These are quality trombones of a recognizable manufacturers that are readily available, and have proven to play well in tune, play easily for the student, require the least amount of maintenance, and are reasonably priced.

Recommended Beginner Trombones:

- Barrington BRG-102 Series
- Prelude TB701 Series
- Blessing BTB-1280
- Weril Alpha G670
- Jupiter 536L Series (F-attachment)

Recommended Intermediate Trombones

- Bach 42BO Stradivarius (F-attachment)
- Conn 88HO (F-attachment)
- Yamaha TSL-448G (F-attachment)
- King 607F (F-attachment)

Trombone Mutes

Just as with the trumpet and horn, mutes are a vital part of the trombone player's equipment. A mute is an appliance that is put into the bell of the trombone and modifies the tone color or timbre of the instrument. They can be constructed from a variety of materials like cardboard, hardboard (fiber), plastic, metal (aluminum, copper, brass), and wood.[17]

[17] The Woodwind & Brasswind, *Mutes-Brass Accessories*, 2006, http://www/wwbw.com/Mutes-Brass-Accessories1.wwbw (accessed Febuary 1, 2010). Reprinted with permission.

There are dozens of mutes available for a trombone player, but there are really only four basic mutes that are called for on a regular basis in middle school and high school band: straight mute, cup mute, bucket mute, and plunger mute. It is important for a music educator to be familiar with playing properties of the basic mutes. While mutes modify the timbre of the trombone, they also create inherent problems; mutes change the blowing resistance and overall intonation of the instrument. The following descriptions and functions of each mute will provide a comprehensive view as to their practical application.

Straight Mute

The straight mute is a standard trombone mute. Trombone straight mutes are larger than trumpet straight mutes and are the most common mutes called for by composers; they are found in orchestras, wind ensembles, jazz bands, and commercial music. If a mute is indicated in the music and a specific mute is not indicated, it is assumed that a straight mute should be used.

Figure 7-17:
Aluminum straight mute

Cup Mute

The cup mute is a standard trombone mute. Cup mutes are commonly found in jazz bands, combos, and commercial music; however, one will find on occasion the cup mute in orchestras and wind ensembles.

Figure 7-18: Aluminum cup mute

Bucket Mute

The bucket mute is a standard trombone mute. This mute has two designs. The first design is an oversized straight mute with large holes in along the side (see figure 7-19). The second design is a bucket with springs that clips to the rim of the bell. This mute is filled with cotton and batting that removes high frequencies and produces soft, muffled tone.

Figure 7-19: Aluminum bucket mute

Plunger Mute:

The trombone plunger mute is much larger that the trumpet plunger mute, but is utilized in the same way. This mute is used mainly for jazz styles. This mute is used to create a "Do-Wah" effect notated with a "+" over the note to indicate that it is to be played with the plunger closed over the bell, and with an "o" over the note to indicate that it is to be played without the plunger

Trombone Methods and Study Materials

The following lists are standard method books and study materials for private study in trombone. This is by no means a comprehensive list. This is simply a list that contains essential material with varying degrees of technical difficult and melodious styles of music. The levels are categorized into ***skill levels*** and ***years of experience*** and do not necessarily correspond to a student's academic classification. All skill levels are based on individual judgment.

Beginner Methods (0-2 years)

- Beeler: *Trombone Method,* Vol 1 & 2 (Warner Bros.)
- E. Clarke: *Elementary Studies* (C. Fischer)
- Ridgeon: *Brass for Beginners* (Boosey & Hawkes)
- Long: *Rubank Elementary Method*, Vol. 1 & 2 (Rubank)
- Slokar: *Method for Trombone* (Reift)

Intermediate Methods (1-5 years)

- Arban: *Complete Conservatory Method,* ed Alessi and Bowman (Encore Press)
- Bordogni: *Melodious Etudes,* Transcribed by Rochut (C. Fisher)
- Clark: *Technical Studies* (C. Fischer)
- Schlossberg: *Daily Drills and Technical Studies* (M. Baron)
- LaFosse: *Methode Complete,* Vol. 1, 2, and 3 (A. Leduc)
- Tyrrell: *40 Progressive Studies* (Boosey & Hawkes)

Advanced Methods (4 years and up)

- Bitsch: *15 Etudes de Rhythme* (A. Leduc)
- Blazhevich: *Clef Studies* (International)
- Kopprasch: *60 Selested Studies,* Vol. 1 & 2 (C. Fischer)
- Marsteller: *Advanced Slide Techniques* (Southern)
- Maxted: *20 Studies for Tenor Trombone* (E. Williams)

Trombone Books, Journals, and Websites

The following are recommend books, journals, and websites about the trombone. This is by no means a comprehensive list. This is simply a list of trombone writings and resources of various categories of trombone research. They represent historical, pedagogical, and analytical studies on the trombone.

Trombone Books

Bate, Philip. *The Trumpet and Trombone: An Outline of Their History, Development, and Construction*, 2nd ed. London: Ernest Benn, Ltd., 1978; New York: Norton, 1978.

Fink, Reginald H. *The Trombonist's Handbook*. Athens, Ohio: Accura Music, 1977.

Gregory, Robin. *The Trombone*. New York: Faber & Faber, 1973.

Guion, David M. *The Trombone: Its History and Music 1697-1811*. New York: Gordon & Breach, 1988.

Kagarice, Vern L., et al. *Solos for the Student Trombonist*: An Annotated Bibliography. Nashville, Tenn.: Brass Press, 1979.

Kleinhammer, Edward. *The Art of Trombone Playing*. Summy-Birchard, 1996.

Kleinhammer, Edward. *Mastering the Trombone*. Hannover, Germany: Edition Piccolo, 1997.

Knaub, Donald: Trombone Teaching Techniques, 2nd ed. Athens, Ohio: Accura Music, 1977.

Lupica, Benedict. *The Magnificent Bone: A Comprehensive Study of the Slide Trombone*. New York: Vantage Press, 1974.

Maxted, George. Talking About the Trombone. London: J. Baker, 1970.

Wick, Denis. *Trombone Technique*, 2nd ed. London: Oxford University Press, 1984.

Wigness, C. Robert. *The Soloistic Use of the Trombone in Eighteenth Century Vienna*. Nashville, Tenn.: Brass Press, 1978.

Trombone Journals

- *International Trombone Association*
- *Historical Brass Society*
- *Brass Bulletin*

Trombone Websites

- International Trombone Association *www.ita-web.org*
- Trombone Page of the World *www.trombone-usa.com*
- Online Trombone Journal *www.trombone.org*

Chapter 8

The Euphonium and Baritone

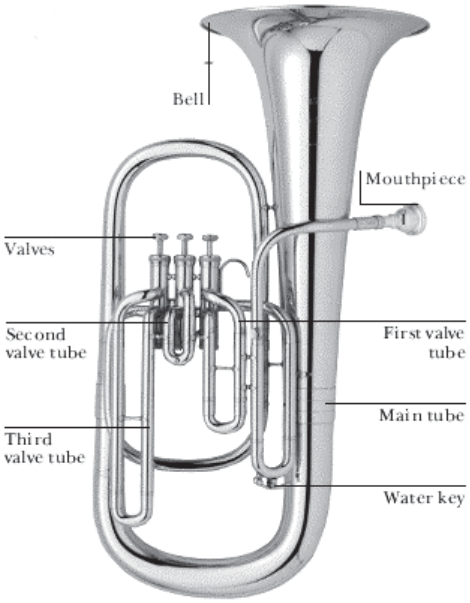


Figure 8-1: Parts of the euphonium *(Photo used with permission)*[1]

The euphonium and baritone serve as the tenor/baritone voice of the brass family and are keyed in Bb. However, the euphonium is a large-bore instrument (.563-.592 inches) and the baritone is more of a small-bore instrument (.488-.522 inches).[2] The euphonium has a long, gradual bell flare ending with a wide bell (11-12 inches); these traits create a deeper, darker sound, much like the tuba. The baritone has a short, quick bell flare ending with a narrower bell (8.25-10 inches); these traits create a thinner, brighter sound, much like a trombone. The euphonium and baritone family consists of several instruments ranging in

[1] David M. Grasmick, *California State Polytechnic University, Pomona*, 2008, http://www.csupomona.edu/~dmgrasmick/mu330/Trumpetlecture.html (accessed 2010). Reprinted with permission for educational purposes using Microsoft Musical Instruments, 1994.

[2] David Werden, "Euphonium, Baritone or ???," *Euphonium Articles*, 2010, www.dwerden.com (accessed October 2010), 5.

bore sizes and designs. The euphoniums and baritones commonly made available are the following:

- Non-compensating Euphonium (Three or Four-Valves)
- Compensating Euphonium (Four-Valves)
- Marching Euphonium
- Front Action Baritone (Three or Four-Valves)
- Upright Baritone (Three or Four-Valves)

Both the euphonium and baritone can be used as a beginner's instrument of choice. However, today's music educators like to use the euphonium as the regular beginner instrument, because it develops the American concept of sound and also creates the ability to switch the young student to the tuba after they physically mature.[3] Like the trombone, the length of the euphonium and baritone is approximately 9 feet (270 cm)[4] and they have a written range of low C – b-flat1 (four-valve).

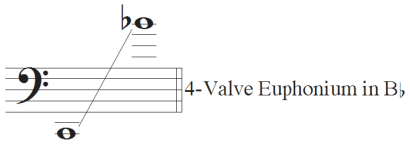


Figure 8-2: The range of four-valve euphonium in Bb[5]

All euphoniums and baritones can be written in bass clef or treble clef. The euphonium player reads a bass or treble clef part using the appropriate fingerings. The bass clef parts are non-transposing; their written pitches are the same as their sounding pitches. Most beginners start with bass clef euphonium/baritone parts. The treble clef parts are

[3] Mark C. Ely and Amy E. Van Deuren, *Wind Talk for Brass* (Oxford: Oxford University Press, 2009), 382.

[4] Anthony Baines, *Brass Instruments: Their History and Development*, Reprint (New York: Dover, 1980), 26.

[5] William J. Skeat, Harry F. Clarke and Russell V. Morgan, *The Fundamentals of Band Arranging* (New York: Sam Fox Publications Company, 1965), 19.

transpositioned, and sound a major 9th lower than written. Treble clef euphonium and baritone parts work well for trumpet players who later switch to euphonium, treble clef euphonium/baritone fingerings are the same as trumpet fingerings.

Music educators should have an understanding of the practical ranges of beginning, intermediate, and advanced euphonium/baritone students. A student's range will vary according to the student's experience and ability. Range can be extended when the fundamentals of embouchure formation and tone production are mastered. The following chart serves only a guide for music educators in determining range ability.

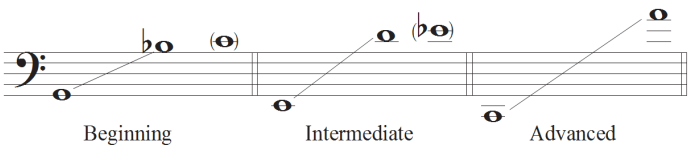


Figure 8-3: Beginning, intermediate, and advanced euphonium range[6]

Modern Euphoniums

Today's modern euphoniums can be categorized into two basic types: compensating euphonium and non-compensating euphonium. Compensating valve systems were designed to bring the low register of the euphonium in tune and create a full chromatic scale between low E and pedal Bb. This system uses extra tubing with a side valve that detours the air through the "compensating loops" around the three main valves.[7] Basically this system "compensates" extra tubing needed to play the low register in tune.

[6] Ely, 2009, 395.

[7] Ely, 2009, 363.

Euphonium, four valve (non-compensating)

Figure 8-4: Yamaha YEP-321 four-valve euphonium *(Photo used with permission)*[8]

Pitched in Bb, the four valve non-compensating euphonium is the standard beginning and intermediate instrument. They can be found in all types of beginner band programs. The non-compensating euphonium is light weight and usually is the less expensive euphonium. It has limitations due to the intonation in the low register and is only recommended as a beginner instrument.

Euphonium (compensating)

Figure 8-5: Besson BE967 compensating euphonium *(Photo used with permission)*[9]

[8] The Woodwind & Brasswind, *Euphoniums*, 2006, http://www.wwbw.com/Euphoniums-Brass-Instruments1.wwbw (accessed February 7, 2010). Reprinted with permission.

[9] The Woodwind & Brasswind, *Euphoniums*, 2006, http://www.wwbw.com/Euphoniums-Brass-Instruments1,Page 7.wwbw (accessed February 7, 2010). Reprinted with permission.

Pitched in Bb, the compensading euphonium is the standard college and professional instrument. It is found in all types of professional military bands, college wind bands, and British brass bands. More expensive than the non-compesating, the compensating euphonium has better intonation in the low register and better all around craftmenship.

Marching Euphonium

Figure 8-6: Yamaha YEP202M marching euphonium (*Photo used with permission)*[10]

Pitched in Bb, the marching euphonium (or baritone) is designed for the marching band configuration. Much like the design of the trumpet with front facing bell and vertical valve placement, the marching euphonium can project better that the traditional upright euphonium.

Modern Baritones

Today's modern American baritones can be categorized into two basic types: front action baritone and upright baritone. Typically the baritone is considered a student-line instrument. Usually having three valves, the baritone timbre is less desired throughout the United States school systems. Parts that indicate baritone usually mean euphonium, and can be played on either instrument.

[10] The Woodwind & Brasswind, *Marching Euphoniums*, 2006, http://www.wwbw.com/Marching-Euphoniums-Euphonium2.wwbw (accessed February 7, 2010). Reprinted with permission.

Front Action Baritone

Figure 8-7: King 2268 Artist Series four-valve baritone horn *(Photo used with permission)*[11]

Pitched in Bb, the front action baritone (bell facing forward) is a standand beginning instrument. Some schools in America still use these instruments. Sometimes considered "old fashioned" when compared to the modern euphonium, this baritone is call "front action" because the valves are placed in the front of the instrument.

Upright Baritone

Figure 8-8: York 3055 Bb baritone horn *(Photo used with permission)*[12]

[11] The Woodwind & Brasswind, *Bb Baritone Horn*, February 2006, http://www.wwbw.com/Baritone-Horns-Instruments1,Page-2.wwbw (accessed February 2010). Reprinted with permission.

[12] The Woodwind & Brasswind, *Bb Baritone Horn*, February 2006, http://www.wwbw.com/Baritone-Horns-Instruments1,Page-2.wwbw (accessed February 2010). Reprinted with permission.

Pitched in Bb, the upright baritone is a standand beginning instrument. Like the front action baritone, schools in America still use the upright baritone. This baritone is called a upright baritone because the valves are placed upright on the body of the instrument.

Euphonium Valve Systems

The euphonium primarily uses piston valves. There are front-action rotary valve baritones, but these are seldom seen or used in America. Euphoniums can have three or four valves. Some euphoniums have a fourth valve compensating system. When the fourth valve is engaged with another valve, the air column is sent back through a different shorter set of valve tubing, which adds the necessary lengths to lower the pitch if the notes that are otherwise played by the sharp valve combinations (1-2, 1-3, and 1-2-3).

Fundamental Concepts of Euphonium Playing

The following are fundimental concepts of euphonium playing. They cover the beginning concept of hand position, playing posture, embouchure, mouthpiece placement, and articulation. There are step-by-step details to help guide the student.

Hand Position and Playing Posture

The euphonium may rest on the chair between the player's legs or on the player's lap. It is important that the mouthpiece and mouthpiece angle can easly align with the player's embouchure without strain. Sometimes a cushion will be needed to adjust the height of the euphonium or performer for correct alignment of the embouchure and mouthpiece.

Euphonium

Step 1: For a euphonium, place the right hand between the upper bend and the main tubing, and place the finger on top of the valves. Some euphoniums may have a thumb ring or tube for the hand to grasp.

Step 2: The left hand will wrap around the main tubing and grasp for support.

Figure 8-9: Hands and playing posture for euphonium *(Photo used with permission)*[13]

Front-Action Baritone

Step 1: For a front action baritone (Figure 8-12), the right hand will reach around to the front of the tuba where the thumb will be place in the thumb ring and the fingers rest on the valves.

Step 2: The left hand will hold the main body of tubing and support much of the weight or rest comfortably on the top bow within reach of the first valve slide for adjustment to control intonation.

[13] Norlan Bewley, "Holton," *norlanbewley.com*, www.norlanbewley.com/holton331.htm (accessed October 2009). Reprinted with permission.

Euphonium Embouchure and Mouthpiece Placement

The euphonium embouchure is simular the trombone embouchure. Both the euphonium and trombone use the same sized mouthpieces and require the same sized aperture. The euphonium mouthpiece will generally be centered horizontally and the approximate vertical placement is usually **60/40 or 50/50**. The angle of the mouthpiece/euphonium, like the trumpet, horn, and trombone, will generally tilt down slightly.

Figure 8-10: Euphonium embouchure[14]

Euphonium Tonguing

The euphonium uses the tongue to articulate the beginning of each note. Tonguing is an individual matter depending on the formation of the teeth and jaw. The thickness and length of the tongue and the size of the oral cavity contribute to articulating with the tongue. There are some differing opinions about tongue placement when articulating on euphonium. Some teachers feel that a player should use the tip of the tongue to touch the upper teeth along the gum line. Syllables like "too," "toe," or "tah" will demonstrate the proper tongue placement. Other teachers instruct to tongue slightly between the teeth, as if to "spit" a piece of hair off the tip of the tongue. It is important to experiment with the different approaches to find the best methods for your students.

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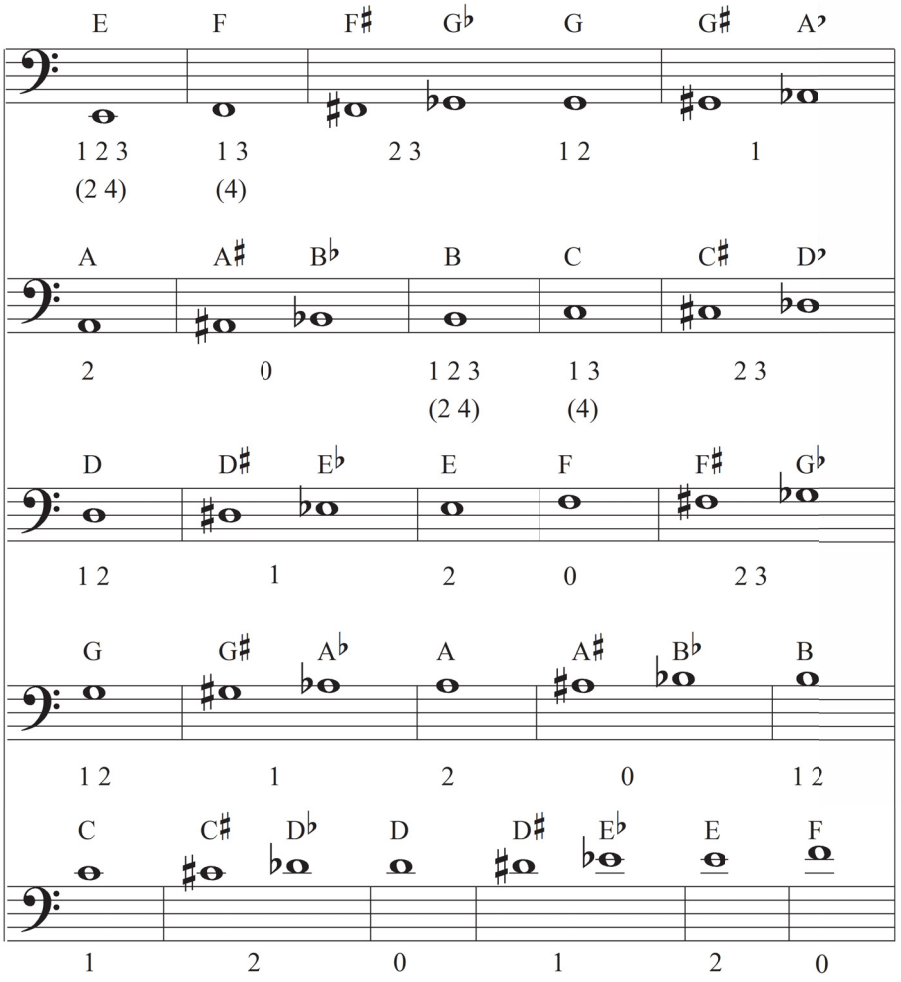
[14] Philip Farkas, *The Art of Brass Playing* (Bloomington, Indiana: Brass Publications, 1962), 30. Photos of Robert Lambert, former principal trombone, Chicago Symphony Orchestra.

Euphonium/Baritone Techniques

The following section contains euphonium and baritone reference material for teaching. Included in the section are bass clef and treble clef fingering charts, and bass clef and treble clef harmonic series charts. Music educators should memorize the charts for teaching purposes.

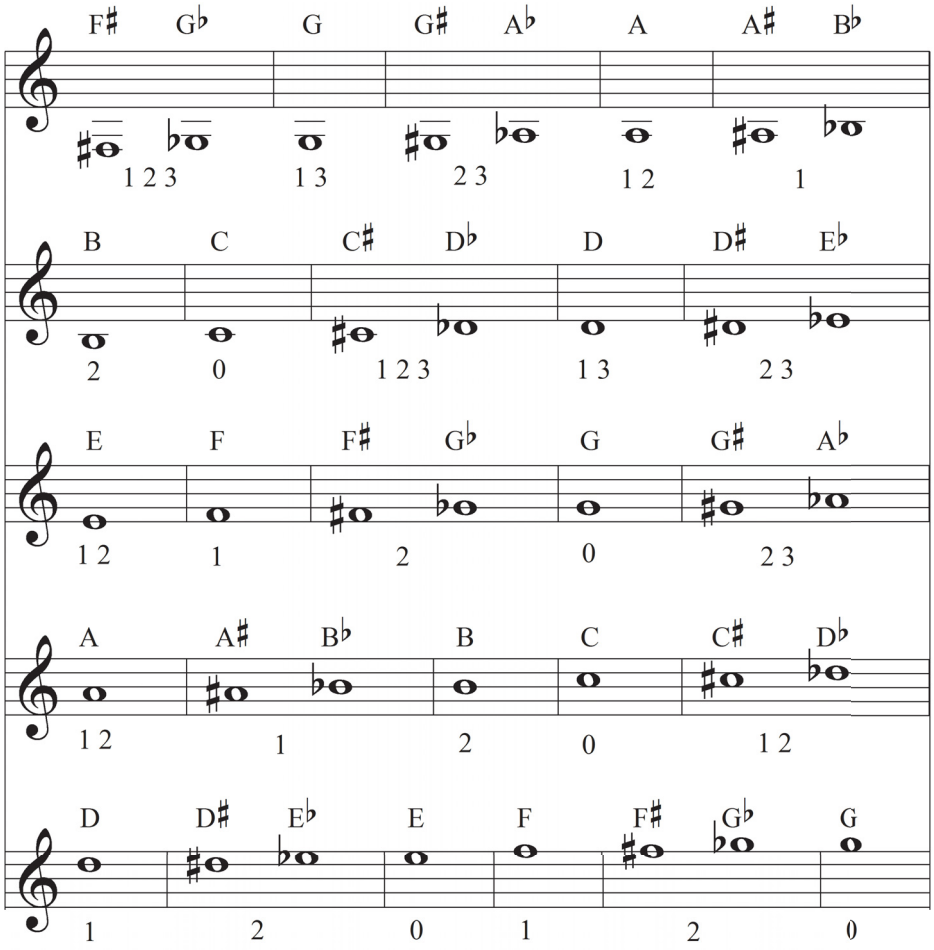
Bass Clef Euphonium/Baritone Fingering Chart

The following chart displays bass clef euphonium and baritone fingerings and alternate fingerings for each note of the practical range. Euphoniums with a fourth valve should use the alternate fingerings in parentheses.



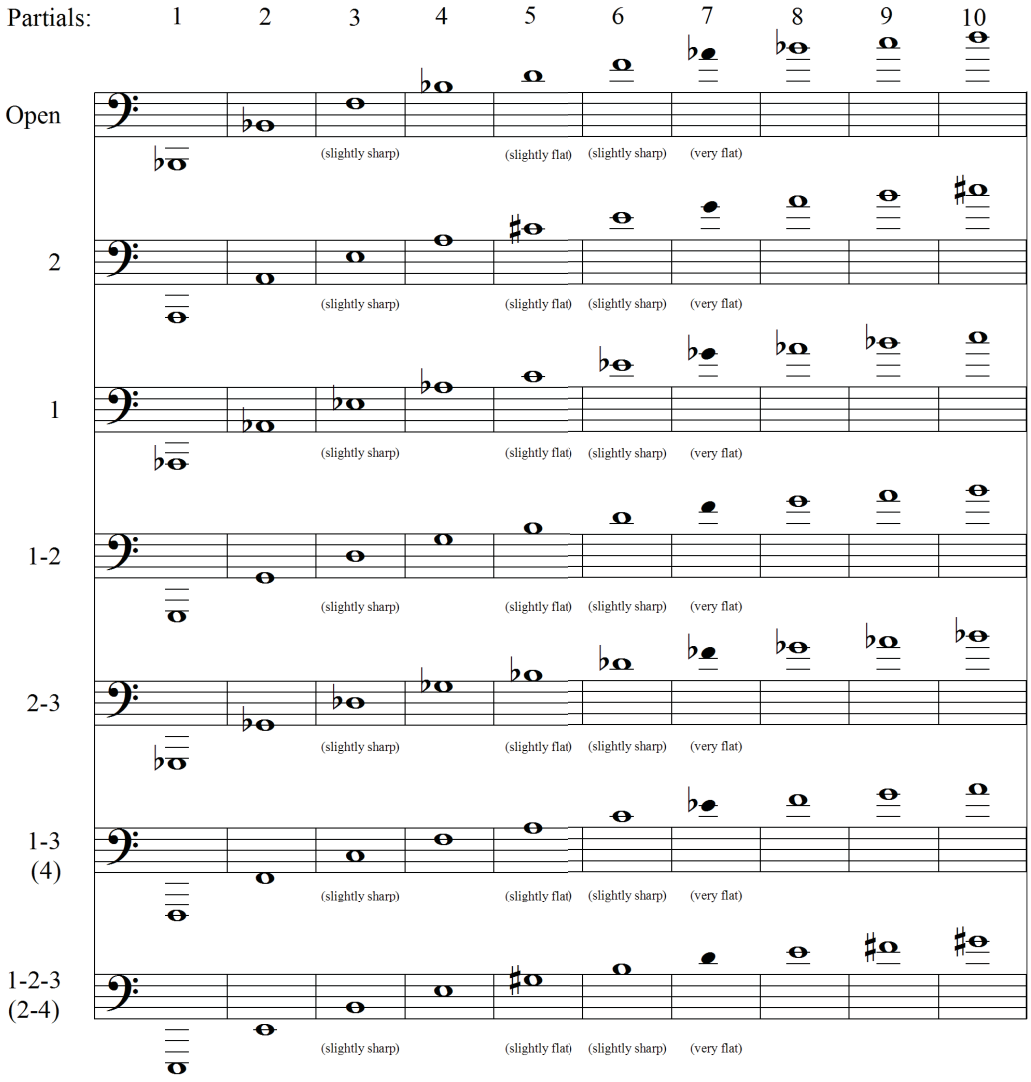
Treble Clef Euphonium/Baritone Fingering Chart

The following chart displays treble clef euphonium and baritone fingerings, and the alternate fingerings for each note of the practical range. Euphoniums with a fourth valve should use the alternate fingerings: 1-2-3 = 2-4 and 1-3 = 4. Notice that treble clef euphonium fingerings are the same as trumpet fingerings, however, the transposition sounds a major 9th lower than written.



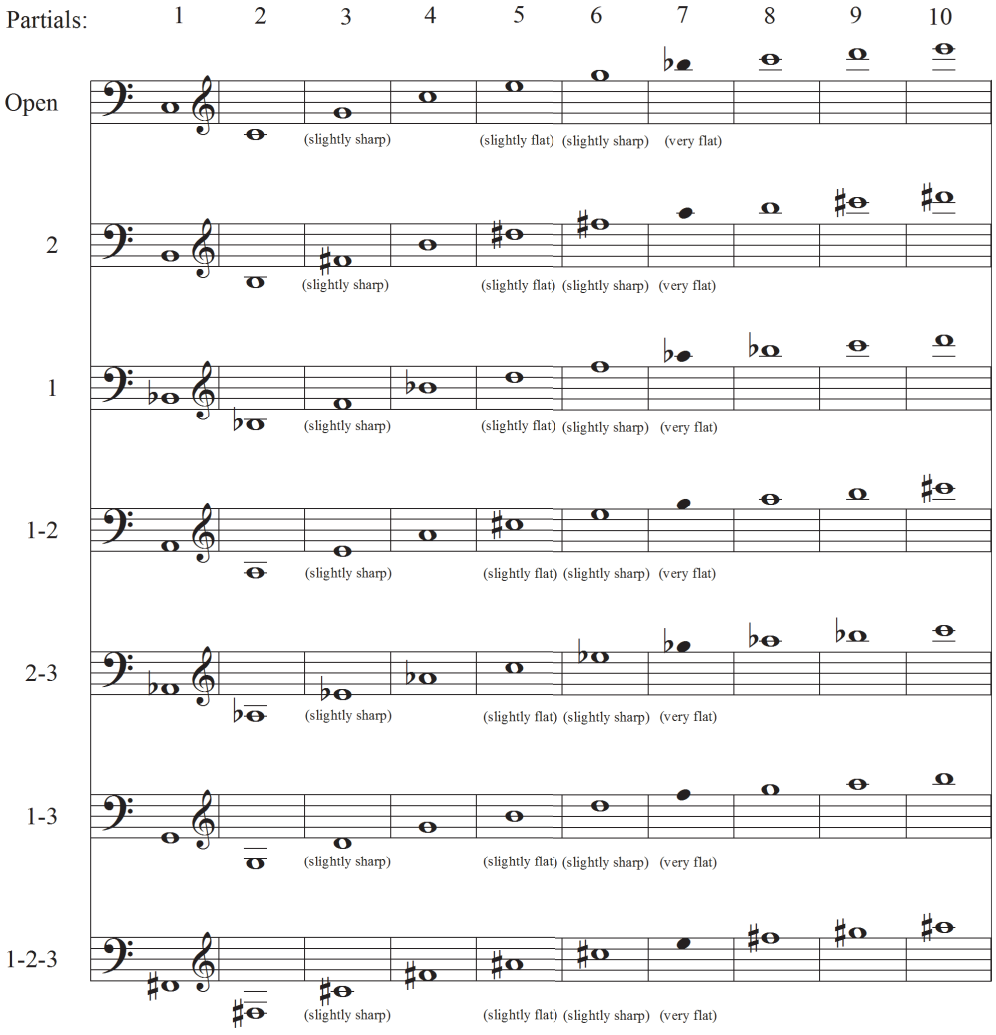
Bass Clef Euphonium/Baritone Harmonic Series

The following chart is the bass clef euphonium and baritone harmonic series and it illustrates all of the notes that sound with specific fingering combinations. Take note of the out-of-tune partials. It is important to know these natural tendencies for tuning purposes. Notice the 7th harmonic partial is very flat and it is recommended to use an alternate fingering.



Treble Clef Euphonium/Baritone Harmonic Series

The following chart is the treble clef euphonium and baritone harmonic series and it illustrates all of the notes that sound with specific fingering combinations.



Euphonium Equipment

In many music programs across the country, music educators are responsible for supplying good working and reliable instruments for students. The following are recommended lists that provide beginner and intermediate mouthpieces and euphoniums as well as a standard mute.

Choosing a Euphonium Mouthpiece[15]

Beginners should start with a small to medium-size mouthpiece. A more compact cup and focused rim will help center the sound at the early stages of playing. As the student matures, with the help of a teacher, they should begin to experiment with bigger mouthpieces.

The following is a list of recommended euphonium mouthpieces for beginner and intermediate/advanced students. These are high-quality mouthpieces of recognizable manufacturers that are readily available. The following mouthpieces will help provide the student quick response in all ranges, clear articulations, easy flexibility, reliable intonation, and good endurance.

Euphonium mouthpieces are made for small and large shanks. It is necessary to know whether the euphonium's leadpipe is designed for a large or small mouthpiece shank.

Beginner Mouthpieces

- Bach – 12C, 11
- Denis Wick – 6B
- Yamaha – 48
- Schilke – 46D

[15] David R. Werden, "Euphonium Mouthpieces – A Teacher's Guide," *The Instrumentalist* (May 1981), 23-26.

Intermediate/Advanced Mouthpieces:

- Bach – 6½ AL
- Denis Wick – SM5, SM4
- Schlike – 46D, 51D
- Yamaha – 48D, 51

Choosing a Euphonium

In many music programs across the country, music educators are responsible for supplying good working and reliable instruments for the students. The following lists are recommended beginner and intermediate euphoniums makes and models. They are quality euphoniums of recognizable manufacturers that are readily available. These euphoniums have proven to play well in tune, play easily for the student, require the least amount of maintenance, and are reasonably priced.

Recommended Beginner Euphoniums

- Yamaha YEP-201 Series 3-Valve
- B&S 170 Series 3-Valve
- W. Nirschl I-500LQ 3-Valve
- Kanstul 980 Series 3-Valve
- Jupiter 474 Series 3-Valve

Recommended Intermediate Euphoniums

- King 2280 Legend Soloist Series 4-Valve
- B&S 175 Series 4-Valve
- Yamaha YEP-321 Series 4-Valve
- W. Nirschl I-800LQ 4-Valve (Compensating)
- Yamaha YEP-642 Series 4-Valve (Compensating)

Euphonium Mute

Figure 8-11: Dennis Wick Euphonium Mute *(Photo used with permission)*

The euphonium mute has become part of the performer's regular equipment. Even though a very small percentage of euphonium literature uses the mute, new composers are utilizing the muted timbre. Euphonium mutes are normally a straight-mute. Much like the trumpet and trombone mutes, euphonium mutes can be made of fiber, wood, aluminum, and plastic. As with other brass, the euphonium mute has a tendency to sharpen the overall pitch, so one must pull-out the tuning slide before playing.

Euphonium Methods and Study Materials

The following lists are standard method books and study materials for private study in euphonium. This is by no means a comprehensive list. This is simply a list that contains essential material with varying degrees of technical difficulty and melodious styles of music. The levels are categorized into ***skill levels*** and ***years of experience*** and do not necessarily correspond to a student's academic classification. All skill levels are based on individual judgment.

Beginner Methods (0-2 years)

- Beeler: *Trombone Method,* Vol 1 & 2 (Warner Bros.)
- Long: *Rubank Elementary Method*, Vol. 1 & 2 (Rubank)
- Ridgeon: *Brass for Beginners* (Boosey & Hawkes)
- Uber: *70 Beginning and Early Studies* (PP Music)
- Wiggins: *First Tunes and Studies* (Oxford)
- Williams: *Little Classics* (Colin)

Intermediate Methods (1-5 years)

- Arban: *Complete Conservatory Method,* ed Goldman and Smith (C. Fischer)
- Bordogni: *Melodious Etudes,* Transcribed by Rochut (C. Fisher)
- H. L. Clark: *Technical Studies* (C. Fischer)
- Kopprasch: *60 Selected Studies*(C. Fischer)
- Sparke: *Scales and Arpeggios* (Studio Music)
- Tyrrell: *40 Progressive Studies* (Boosey & Hawkes)

Advanced Methods (4 years and up)

- Charlier: *32 Etudes de perfectionnement* (H. Lemoine)
- Green: *Euphonium Eurhythmics* (Warwick)
- Clark: *Character Studies* (C. Fischer)
- Maxime-Alphonse: *Etudes nouvelles,* 3 vols. (A. Leduc)
- Mueller: *Technical Studies,* vol. 3 (C. Fisher)

Euphonium Books, Journals, and Websites

The following are recommend books, journals, and websites about the euphonium. This is by no means a comprehensive list. This is simply a list of euphonium writings and resources of various categories of euphonium research. They represent historical, pedagogical, and analytical studies on the euphonium.

Euphonium Books

Bahr, Edward R. Trombone/Euphonium Discography. Stevens Point, Wis.: Index House, 1988.

Bevan, Clifford. *The Tuba Family*. New York: Scribner's, 1978.

Bowman, Brian L. *Practical hints on Playing the Baritone (Euphonium)*. Melville, N.Y.: Belwin-Mills, 1983.

Childs, Robert and Nicholas. *A Method for Brass Players*. Kirklees Music/Obrasso Verlag AG.

Griffiths, John R. *The Low Brass Guide*. Hackensack, N.J.: Jerona Music, 1980.

Lehman, Arthur. *The Art of Euphonium Playing*. Poughkeepsie, N.Y.: Robert Hoe.

Louder, Earle L. *Euphonium Music Guide*. Evanston, Ill.: The Instrumentalist Co., 1978.

Miles, David Royal. *An Annotated Bibliography of Selected Contemporary Euphonium Solo Literature by American Composers*. Tuba Press, 1992.

Preinsperger, Ewald. *Solo Tenorhorn und Blasorchester: Verzeichnis von uber 500 Solowerken fur ein oder muhrere Tenorhorner/Euphonien und Blasorchester. Vienna, Austria*.: J. Kliment, 1995.

Rose, W.H. *Studio Class Manual for Tuba and Euphonium*. Houston, Tex.: Iola Publications, 1980.

Werden, D. *Euphonium Music Guide*. New London, Conn.: Whaling Music.

Werden, D. *Scoring for Euphonium*. New London, Conn.: Whaling Music.

Winter, Denis. *Euphonium Music Guide*. New London, Conn.: Whaling Music, 1983.

Euphonium Journals

- International Tuba Euphonium Association
- Historical Brass Society

Euphonium Websites

- International Tuba Euphonium Association *www.iteaonline,org*
- Euphonium Music Guide *www.dwerden.com/emg/index.cfm*
- Euphonium.net *www.euphonium.net*

Chapter 9

The Tuba

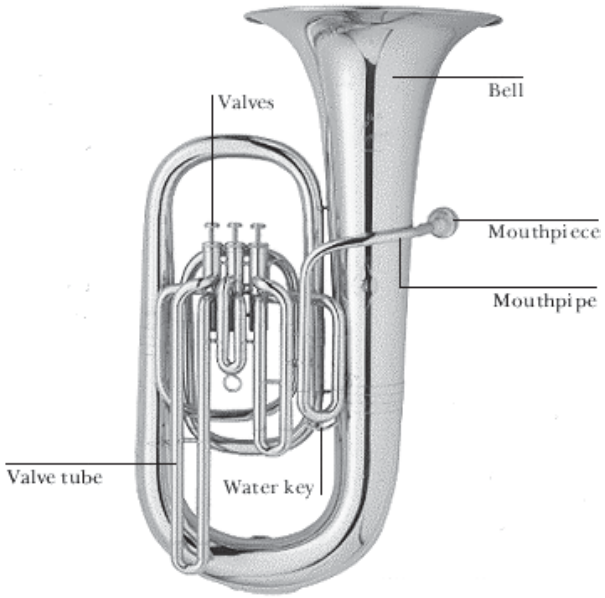


Figure 9-1: Parts of the Tuba *(Photo used with permission)*[1]

The tuba is a conical bore instrument and serves as the bass voice of the brass family. The tuba family consists of several instruments ranging in different keys and sizes. The tubas commonly made available are the following:

- Bb Tenor Tuba (Euphonium)
- F Bass Tuba
- Eb Bass Tuba (Compensating)
- CC Contrabass Tuba
- BBb Contrabass Tuba
- Sousaphone

The BBb contrabass tuba is the standard beginning instrument in American schools, because it offers young students opportunities to master the fundamentals and develop the

[1] David M. Grasmick, *California State Polytechnic University, Pomona*, 2008, http://www.csupomona .edu/~dmgrasmick/mu330/EuphoniumTubalect.html (accessed January 26, 2010), reprinted with permission for educational purposes using Microsoft Musical Instruments, 1994.

correct tone. The BBb tuba also offers a direct association with Bb trumpet, trombone, and euphonium regarding harmonic partials, fingerings, and intonation. However, there are tubas built in the keys of CC, Eb, and F that would be used by advanced collegiate and professional players. It would be quite unusual to find anything other than BBb tubas in middle school or high school. Additional information regarding CC, Eb, and F fingerings and intonation can be found in *The Art of Tuba and Euphonium* by Harvey Phillips.

The length of the BBb tuba is approximently18 feet long (563 cm)[2] and it has a written range of low CC – bb (four-valve). All tubas are non-transposing instruments; their written pitches are the same as their sounding pitches.

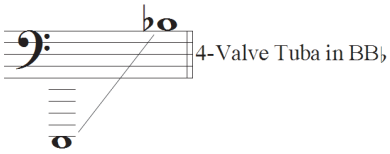


Figure 9-2: Range of the BBb tuba[3]

Music educators should have an understanding of the practical ranges of beginning, intermediate, and advanced tuba students. A student's range will vary according to the student's experience and ability. Range can be extended when the fundamentals of embouchure formation and tone production are mastered. The following chart serves as a guide for music educators in determining range ability.

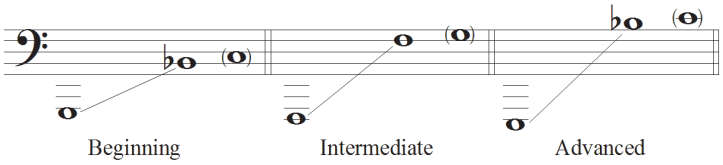


Figure 9-3: Beginning, intermediate, and advanced tuba range[4]

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[2] Anthony Baines, *Brass Instruments: Their History and Development*, Reprint (New York: Dover, 1980), 26.

[3] William J. Skeat, Harry F. Clarke and Russell V. Morgan, *The Fundamentals of Band Arranging* (New York: Sam Fox Publications Company, 1965), 21.

Modern Tubas

Today's modern tubas can be categorized into two basic types: contrabass tubas and bass tubas. The contrabass tubas are the largest of the tuba family. The bass tubas are used for the high tessitura works, chamber, and solo works.

There are two contrabass tubas, the BBb and CC tuba. The contrabass tubas can be heard in virtually every type of ensemble: wind ensembles, concert bands, symphony orchestras, and large chamber ensembles.

There are basically two bass tubas, the Eb and F tubas. The bass tuba is smaller than the contrabass tuba and provides a lighter, brighter sound that enhances the higher orchestral parts. The clarity of sound is preferred for solo and chamber music.

Tubas come in different sizes and are usually categorized in quarters: 3/4, 4/4, 5/4, and 6/4. These are not based on proportion to one another; rather the bore size and bell flare usually determines the sizes. Younger students will often begin on a 3/4 or 4/4 tuba because they lack physical maturity to produce a good breath and tone on a larger instrument.

All of the tubas are non-transposing instruments. The player must learn different sets of fingerings for each tuba (BBb, CC, F, Eb) to play concert pitch.

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[4] Mark C. Ely and Amy E. Van Deuren, *Wind Talk for Brass* (Oxford: Oxford University Press, 2009), 466.

BBb tuba (contrabass)

Figure 9-4: Meinl Weston 195 "Fafner" BBb tuba *(Photo used with permission)*[5]

The BBb tuba is a contrabass tuba. This instrument is used mostly by American public school systems as a beginner tuba. The public school systems use BBb tubas primarily for the ruggedness and because it is in the same key as the Bb trumpet, trombone, and euphonium. In Europe, professionals prefer the darker tone of the BBb tuba and favor it as their primary instrument in orchestras.

CC Tuba (contrabass)

Figure 9-5: Besson Sovereign BE995, CC tuba *(Photo used with permission)*[6]

[5] The Woodwind & Brasswind, *BBb Tubas*, 2006, http://www.wwbw.com/Bb-Tuba-Tubas1,Page-4.wwbw (accessed February 8, 2010). Reprinted with permission.

The CC tuba is a contrabass tuba. The CC tuba is the choice of advanced college students and professional tubists. The CC tuba projects with greater clarity and is built for easier response. The CC tuba is found in the majority of American orchestras. The fingering patterns on CC tuba make it easier to play in sharp keys. Most orchestral works are intended for contrabass tuba unless mark for bass tuba.

F Tuba (bass tuba)

Figure 9-6: B&S PT10 F tuba *(Photo used with permission)*[7]

The F tuba is referred to as a bass tuba. The smaller size of the instrument gives it a lighter, brighter sound that enhances the higher orchestral parts. The clarity of sound is preferred for solo and chamber music. European orchestras prefer F tubas in their orchestras due to the easier blend of sound with the trombones. Works by Berlioz, Brahms, Mendelssohn, and early Wagner call for bass tuba.

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[6] The Woodwind & Brasswind, *CC Tubas,* 2006, http://www.wwbw.com/C-Tuba-Tubas2,Page-3-wwbw (accessed February 8, 2010). Reprinted with permission.

[7] Custom Music International, *B&S F tubas,* 2007, www.customtubas.com/products.php?cat=45 (accessed September 17, 2007). Reprinted with permission.

Eb Tuba (bass tuba)

Figure 9-7: Besson BE981 Sovereign Series compensating Eb Tuba *(Photo used with permission)*[8]

The Eb tuba is referred to as a bass tuba. This instrument is popular in English brass bands. The Eb bass tuba is not widely used in America, but some professionals prefer the Eb to the F as their bass tuba of choice.

Sousaphone

Figure 9-8: Yamaha YSH411 BBb sousaphone *(Photo used with permission)*[9]

[8] The Woodwind & Brasswind, *Eb Tuba*, 2006, http://www.wwbw.com/Eb-Tubas-Tubas1.wwbw (accessed February 8, 2010). Reprinted with permission.

[9] The Woodwind & Brasswind, *Sousaphones*, 2006, http://www.wwbw.com/Sousaphones-Marching-Brass1.wwbw (accessed February 8, 2010). Reprinted with permission.

The sousaphone is a form of tuba built for ease of carrying when marching. Most often it is in the key of BBb, but there are a few pitched in Eb, and CC. Some sousaphones are partly made of fiberglass, for the lightness; however, the quality of sound is poor. The sousaphone is found in marching bands, New Orleans brass bands, and any musical situation where the tuba is mobile.

Tuba Valve Systems

There are two types of valves used on tubas: rotary and piston. Piston valves offer a cleaner articulation and are generally better in technical passages. Rotary valves offer a smoothness of legato sections. Tubas commonly have three or four valves, but some may be equipped five and even six valves.

The fourth valve is added to connect the gap between the lowest valve combinations (1-2-3) to the fundamental. These fourth valve combinations have a tendency to be sharp and pulling of the slide or slides will be needed to correct intonation. The fifth valve (whole step) is used to add a greater selection of combinations that help in the aid of accurate intonation. The sixth valve (half-step), found mainly on F tubas, is added to cover the same range as a CC tuba, for individuals who play the F tuba as their primary instrument.

Fundamental Concepts of Playing the Tuba

The following are fundamental concepts of tuba playing. They cover beginning concepts of hand position, playing posture, embouchure, mouthpiece placement, and articulation. There are step-by-step details and photos to help guide the student.

Hand Position and Playing Posture

The tuba may rest on the chair between the player's legs or on the player's lap. It is important that the mouthpiece and mouthpiece angle can easly align with the player's embouchure without strain. Sometimes a cushion or books will be needed to adjust the tuba or performer for correct alignment of the embouchure and mouthpiece. It is recommended that a young tubist use a tuba stand for easy height adjustment.

Front-Action Tuba

Step 1: For a front action tuba (Figure 9-9), the right hand will reach around to the front of the tuba where the thumb will be placed in the thumb ring and the fingers rest on the valves.

Step 2: The left hand will hold the main body of tubing and support much of the weight or rest comfortably on the top bow within reach of the first valve slide for adjustment to control intonation.

Figure 9-9: Hands and playing position for a front-action tuba *(Photo used with permission)*[10]

Top-Action Tuba

Step 1: For a top-action tuba (Figure 9-10), place the right hand between the upper bend and the main tubing, and place the finger on top of the valves. Some tubas may have a thumb ring or tube for the hand to grasp.

Step 2: The left hand will wrap around the main tubing and grasp for support.

Figure 9-10: Hands and playing position for a top-action tuba *(Photo used with permission)*[11]

[10] Norlan Bewley, "Holton," *norlanbewley.com*, www.norlanbewley.com/holton331.htm (accessed October 10, 2009). Reprinted with permission.

[11] Photo of Dr. William Winkle, Professor of Tuba and Euphonium at Chadron State College. Reprinted with permission.

Tuba Eubouchure and Mouthpiece Placement

The tuba embouchure has the largest aperture in the brass family because of the large mouthpiece. The tuba mouthpiece will be generally centered horizontally and the approximate vertical placement is usually **60/40 or 50/50**. The angle of the mouthpiece/tuba, like most of the brass instruments, will generally tilt down slightly.

Figure 9-11: Tuba embouchure and mouthpiece placement[12]

[12] Philip Farkas, *The Art of Brass Playing* (Bloomington, Indiana: Brass Publications, 1962), 31. Photos of Arnold Jacobs, former principal tuba, Chicago Symphony Orchestra.

Tuba Tonguing

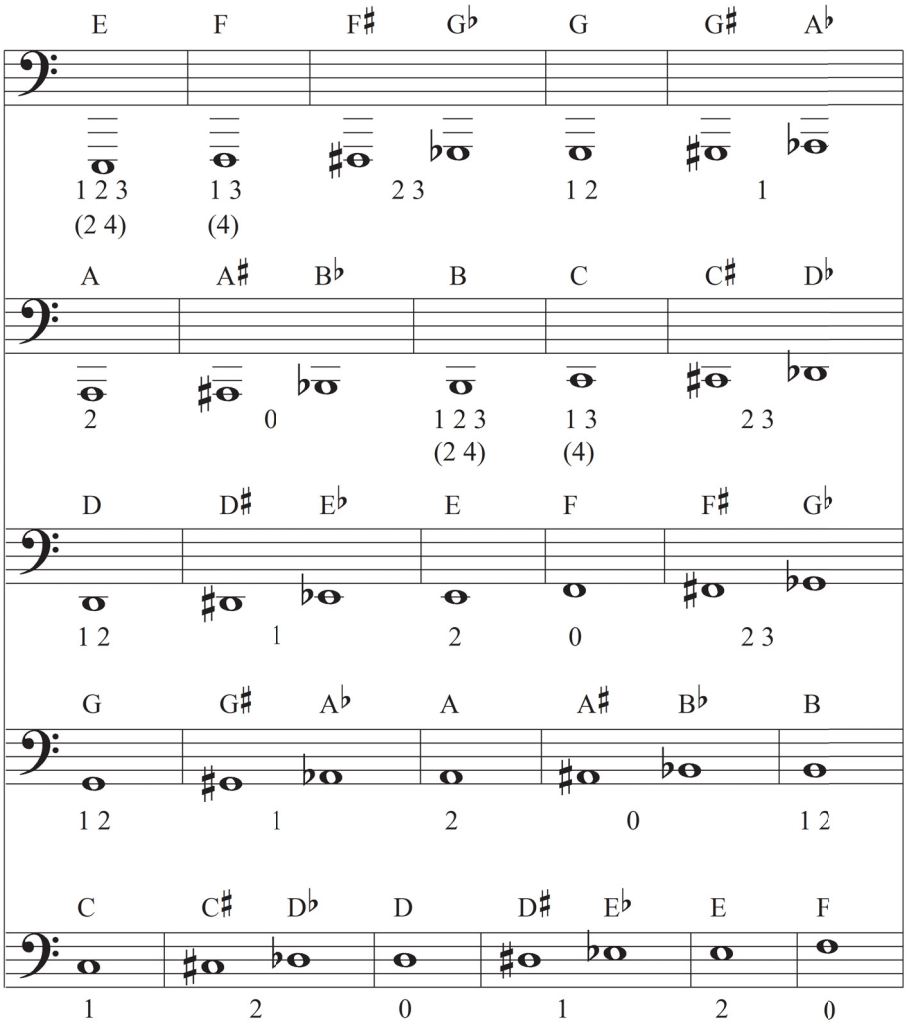
The tuba uses the tongue to articulate the beginning of each note. The tongue acts like a valve, releasing the air stream into the instrument. There are some differing opinions about tongue placement when articulating; however most teachers would agree that a tubist should use the tip of the tongue to touch below the upper teeth. Syllables like “toe,” or “thoeh,” will demonstrate the proper tongue placement. The goal is to keep the oral cavity open with the tongue remaining low in the mouth.

Tuba Technique

The following section contains tuba reference material for teaching. Included in the section is a BBb tuba fingering chart, and harmonic series chart. Music educators are encouraged to memorize the charts for teaching purposes.

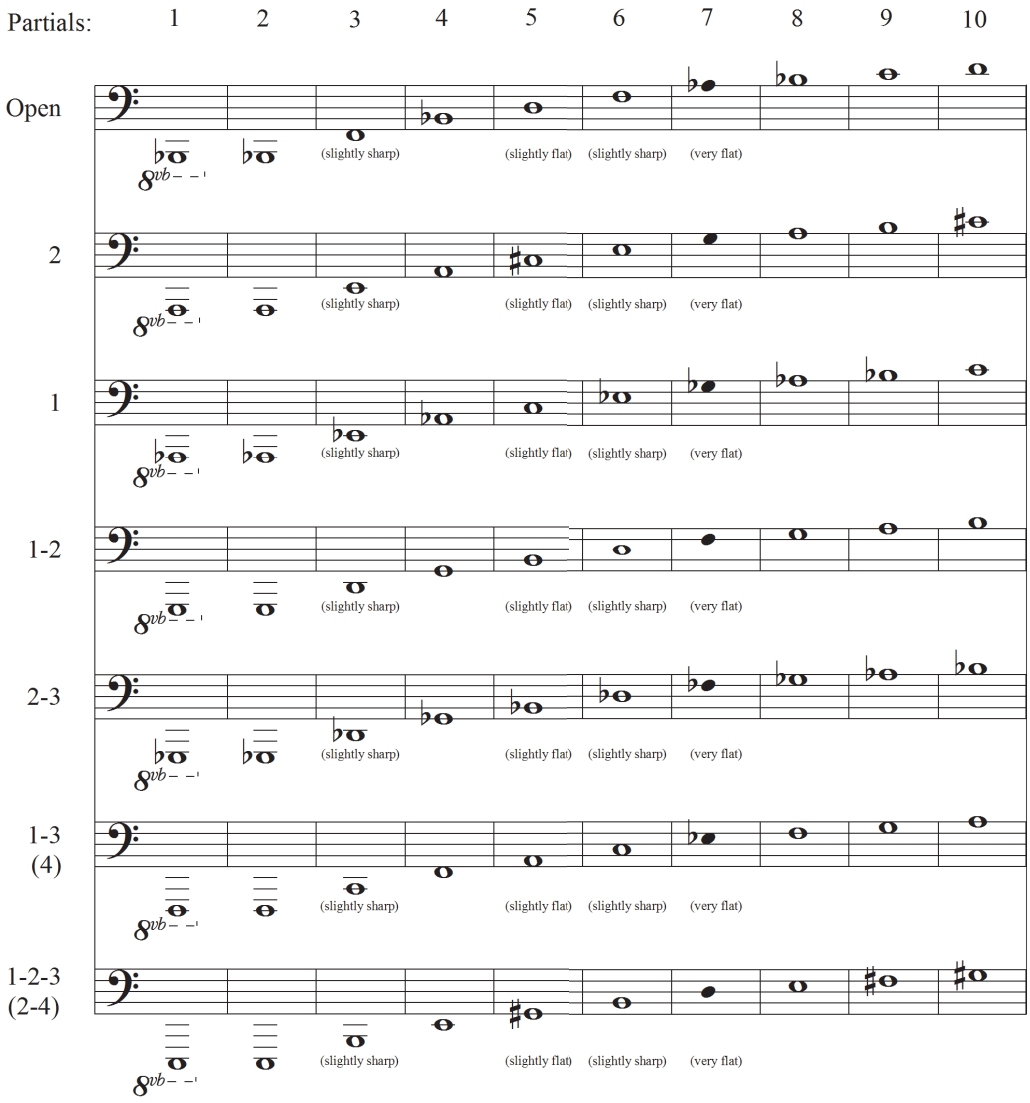
BBb Tuba Fingering Chart

The following chart displays BBb tuba fingerings and alternate fingerings for each note of the practical range. Tubas with a fourth valve may use the alternate fingerings in parenthesis.



BBb Tuba Harmonic Series

The following chart is the BBb tuba harmonic series and shows all of the notes that sound with specific fingering combinations. Take note of the out-of-tune partials. It is important to know these natural tendencies for tuning purposes. Notice the 7th harmonic partial is very flat and it is recommended to use an alternate fingering.



Tuba Equipment

In many music programs across the country, music educators are responsible for supplying good working and reliable instruments for students. The following are recommended lists that provide beginner and intermediate mouthpieces and tubas, as well a standard mute.

Choosing a Tuba Mouthpiece

Beginners should start with a small to medium-size mouthpiece. A more compact cup and focused rim will help center the sound at the early stages of playing. As the student matures, with the help of a teacher, they should begin to experiment with bigger mouthpieces. The following is a list of recommended tuba mouthpieces for beginner and intermediate/advanced students. They are high-quality mouthpieces of recognizable manufacturers that are readily available. These mouthpieces will help provide the student quick response in all ranges, clear articulations, easy flexibility, reliable intonation, and good endurance.

Beginner Mouthpieces

- Bach – 30E, 24AW
- Conn – 7B Helleberg
- Yamaha – 65,
- Schilke - 66

Intermediate/Advanced Mouthpieces

- Bach – 22, 18
- Conn – Helleberg
- Perantucci – 72, 48
- Yamaha - 66

Choosing a Tuba

In many music programs across the country, music educators are responsible for supplying good working and reliable instruments for the students. The following lists are recommended beginner and intermediate tuba makes and models. They are quality tubas of recognizable manufacturers that are readily available. These tubas have proven to play well in tune, play easily for the student, require the least amount of maintenance, and are reasonably priced.

Recommended Beginner BBb Tubas

- Miraphone 182 (three-quarter size)
- King 1135W Series 3-Valve (three-quarter size)
- Yamaha YBB-105 WC (three-quarter size)
- Conn 12J 3 Valve (four-quarter size)
- Yamaha YBB-201 WC (four-quarter size)

Recommended Intermediate BBb Tubas

- Miraphone 186-4U Series 4-Valve (four-quarter size)
- Yamaha YBB-321WC Series 4-Valve (four-quarter size)
- King 2341W Series 4-Valve (four-quarter size)
- Jupiter 582 Concert Series 4-Valve (four-quarter)

Tuba Mute

The tuba mute has become part of the tuba player's regular equipment. Even though a very small percentage of tuba literature uses the mute, new composers are utilizing the muted timbre. The tuba mute is normally a straight mute. Much like the trumpet and trombone mutes, tuba mutes can be made of fiber, wood, aluminum, and plastic. As with other brass, the tuba mute has a tendency to sharpen the overall pitch, so one must pull-out the tuning slide before playing.

Figure 9-12: Humes & Berg Tuba Mute *(Original photo)*

Tuba Methods and Study Materials

The following lists are standard method books and study materials for private study in tuba. This is by no means a comprehensive list. This is simply a list that contains essential material with varying degrees of technical difficultly and melodious styles of music. The levels are categorized into ***skill levels*** and ***years of experience*** and do not necessarily correspond to a student's academic classification. All skill levels are based on individual judgment.

Beginner Methods (0-2 years)

- Arban, G. Prescott arr.: *First and Second Year* (Fischer)
- Beeler: *Method for BBb Tuba, Book I & II* (Warner Bros.)
- Hovey: *Rubank Elementary Method*, Vol. 1 & 2 (Rubank)
- Ridgeon: *Brass for Beginners, Tuba* (Boosey & Hawkes)
- Uber: *70 Beginning & Early Studies* (PP Music)
- Wiggens: *First Tunes & Studies* (Oxford)

Intermediate Methods (1-5 years)

- Arban, ed Young/Jabobs: *Complete Method for Tuba* (Encore)
- Blazhevich: *70 Studies for BB-flat Tuba,* Vol. 1 (King)
- Fink: *Studies in Legato* (Fischer)
- Kopprasch: *60 Selected Studies* (King)
- Getchell: *Second Book of Practical Studies* (Belwin)

Advanced Methods (4 years and up)

- Gallay: *30 Studies* (King)
- Lachman: *26 Etudes* (Hofmeister)
- Laenz: *Zwolf Spezialstudien for Tuba* (Hofmeister)
- Snedecor: *Low Etudes for Tuba* (Alphonse Leduc)
- Vasiliev: 24 Melodious Etudes for Tuba (King)

Tuba Books, Journals, and Websites

The following are recommend books, journals, and websites about the tuba. This is by no means a comprehensive list. This is simply a list of tuba writings and resources of various categories of tuba research. They represent historical, pedagogical, and analytical studies on the tuba.

Tuba Books

Bevan, Clifford. *The Tuba Family*. New York: Scribner's, 1978.

Bird, Gary. *Program Notes for the Solo Tuba.* Bloomington, Indiana: University Press, 1994.

Cummings, Barton. *The Contemporary Tuba*. New London, Conn.: Whaling Music, 1984.

Frederiksen, Brian. *Arnold Jacobs: Song and Wind.* Windsong Press Ltd. 1996.

Griffiths, John R. *The Low Brass Guide.* Hackensack, N.J.: Jerona Music, 1980.

Little, Donald C. *Practical Hints on Playing the Tuba.* Melville, N.Y.: Belwin-Mills, 1984.

Mason, J. Kent. *The Tuba Handbook*. Toronto: Sonante, 1977.

Morris, R. Winston, and Daniel Perantoni ed. *The Tuba Source Book.* Bloomington: Indiana University Press, 2006.

Nelson, Bruce. *Also Sprach Arnold Jacobs a Developmental Guide for Brass Wind Musicians.* Windsong Press Ltd, 2006.

Phillips, Harvey, and William Winkle. *The Art of Tuba and Euphonium Playing*. Secaucus, N.J.: Summy Birchard, 1992.

Stewart, M. Dee. *Arnold Jacobs: The Legacy of a Master.* Northfield, Il: The Instrumentalist Publishing Co., 1987.

Tuba Journals

- *International Tuba and Euphonium Association ITEA (2001-present)*
- *T.U.B.A. Journal (1976-2001)*
- *The Instrumentalist*
- *Journal of Band Research*
- *Windplayer (1985-1993, 1995-1998)*

Tuba Websites

- ITEA online *www.iteaonline.org*
- Tuba News *www.tubanews.com*
- Tube Net *www.chisham.com*
- Tuba/Euphonium Site *www.dwerden.com*
- Tuba 101 *www.tuba101.com*

Chapter 10

Brass Instrument Maintenance

Understanding the care and maintenance of brass instruments is an important part of being an instrumental music educator. It is important for the music educator to be able to perform the following maintenance procedures and to be able to teach these procedures to beginners. The following chapter will offer clear and concise approaches to brass care and maintenance.

Piston Valve Maintenance

Piston valves are primarly found on trumpets, euphoniums, and tubas. Knowing how to dissasemble, oil, and assemble valves is essental to them moving freely and smoothly. It is essential to teach a student how to lubricate piston valves to avoid damage and frozen valves.

Step 1: Unscrew (counter-clockwise) the top valve cap of the first valve and lift the valve halfway out of the casing.

Step 2: Apply two to three drops of oil on the wall of the piston (avoid the holes)

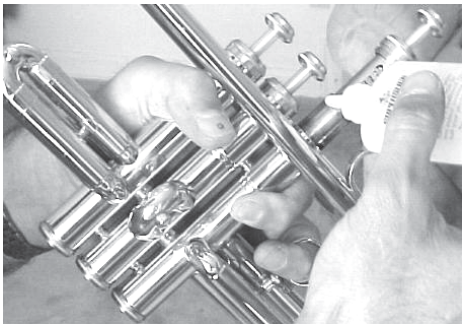


Figure 10-1: Lubricating a piston valve *(Original photo)*

Step 3: Slide the the valve in and out to spread the oil, and add more oil if necessry.

Step 4: Lower the valve into the casing until the valve guide drops into place (you will hear a "click"). There is only one correct way the valve fits into the casing.

Step 5: Tighten the valve caps (clockwise). Oil one valve at a time to avoid dropping or confusing the valves.

Step 6: Blow air through the horn and play a couple of notes to make sure the valves are put together properly. If the valves are not inserted into the casing properly, the instrument will not play. The valve should be removed and inserted into the valve properly (follow the previous steps 1-5).

Trombone Slide Maintenance

The trombone slide lubrication is key to a fast, free moving trombone slide. There are basically three types of products used to lubricate a trombone slide: slide oil, slide cream, and specialty products that combine two lubricants. Many professional players and teachers feel that beginners should start with slide cream, because it has a tendency to last longer without constant reapplication and therefore is more economical. As one becomes more familiar with the different lubricants, one should experiment with other types of lubricants

The secret to any slide lubricant is not to use too much. The key to a fast action slide is to have a *thin* film of lubricant between the inner and outer slide tubes. A feel for how much slide lubricant to use will develop, after several applications. The following procedure will demonstrate how to apply slide cream to a trombone slide.

Step 1: Separate the inner slide (A) from the outer slide (B).

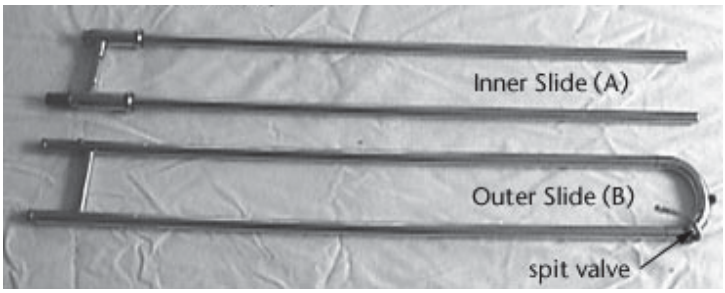
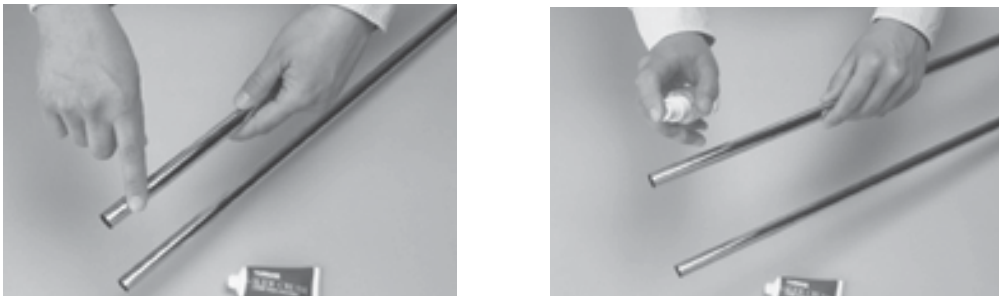


Figure 10-2: Separating the inner slide (A) and outer slide (B)

Step 2: Using a soft cloth that does not produce lint, wipe and clean all of the dirt and residue off of the inner slide (A).

Step 3: With a cleaning rod, wrap a cloth around the end. Insert the cleaning rod in the outer slid (B). Clean and wipe all of the dirt and residue out of the outer slide.

Step 4: Once both slides are clean of residue, apply a small "pea-sized" drop of slide cream to the stockings at the end of the inner slide (A). Gently rub the slide cream evenly up and down the slide. Once the slide cream is applied to the inner slide, spray a light mist of water to the inner slide (B).



A B

Figure 10-3: Appling slide cream (A) and applying water (B)

Step 5: Reassemble the sections of the slide and move it back and forth to spread the lubricant evenly.

Rotary Valve Maintenance

Rotary valves are primarly found on French horns, trombone F-attachments, and tubas. Rotary valves are easy to maintain, and with proper care, they will give trouble-free service for many years. The following procedure will keep rotary valves in good condition, providing a tight air-seal and a smooth, quick, and quiet action.

Step 1: Unscrew the valve caps. Place a drop of bearing and linkage oil on the end of each rotor bearing. Without depressing the levers, pull each valve slide out to the end. The resulting suction will pull oil into the thrust bearing at the end of the rotor. Replace the valve caps.

Step 2: Turn the horn over. Place a drop of spindle bearing and linkage oil at the place where the rotor shaft emerges from the casing of each rotor. Draw the valve slides as in step one.

Step 3: Remove the slides. Holding the slides vertically, apply an eyedropper of rotary valve oil into each slide. Still keeping the slides vertical, insert them all the way into the horn (this keeps the oil off the slide tubes.) Pour the oil onto the rotors, rock the horn back and forth while working the valves to distribute the oil, and drain off the excess.

Step 4: Bearing and linkage oil should be used to lubricate the key hinge rods, ball-and-socket linkages and the springs.

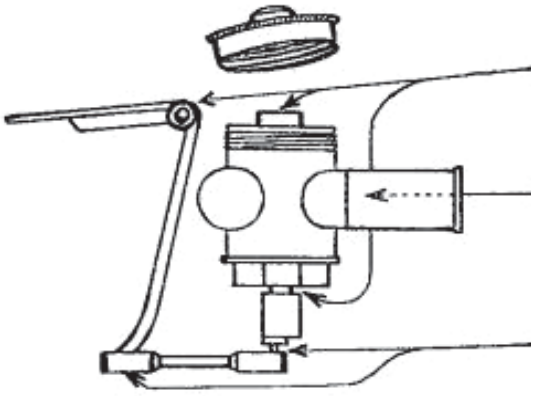


Figure 10-4: Lubrication of a rotary valve *(Diagram used with permission)*[1]

Parts of the Rotary Valve

A necessary skill for a music educator is the ability to string a rotary valve. Whether done backstage as an emergency repair right before a performance or as preventative maintenance, being able to confidently restring a rotary valve can save time and money. The following illustrates the parts of the rotary valve and provides a list of tools and supplies needed to string a rotary valve.

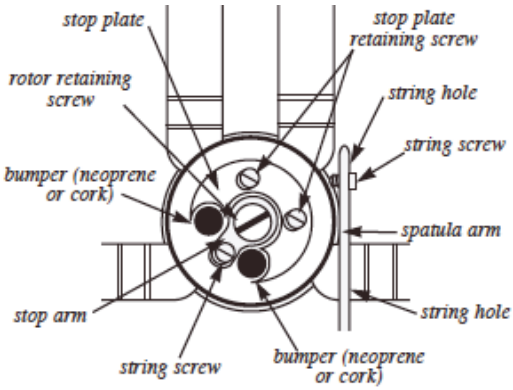
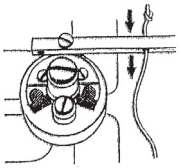


Figure 10-5: Parts of the rotary valve *(Illustration used with permission)*[2]

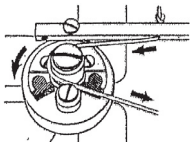
[1] Robert J. Osmun, *Rotary Valve Maintenance*, 2003, http://www.osmun.com reference/ Rot_Maint.htm (accessed July 7, 2008). Diagram used with permission.

[2] Andrew B. Spang, "Lyric Brass," *Studio of Andrew B. Spang*, 1997, www.lyricbrass/spang /articles.html (accessed 2007). Rotary valve illustration used with permission.

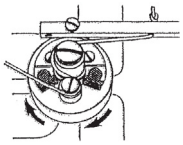
String a Rotary Valve[3]



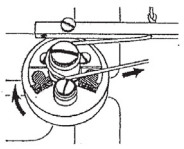
Step 1: Cut a 5 or 6 inch piece of string. Next, tie a small knot at the end of the string and insert the string through the *string hole* in the opposite side of the *spatula***.**



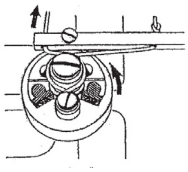
Step 2: Wind the string counterclockwise around the *stop arm*.



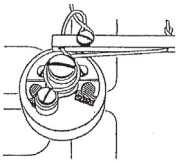
Step 3: Continue clockwise around the *string screw* forming a figure-eight.



Step 4: Circle back around the *stop arm* to complete the figure-eight.



Step 5: Make sure the string passes underneath itself as it completes the figure-eight pattern around the *rotor hub* and *string screw*.



Step 6: With the *set screw* resting against the stopper, adjust the length of the string so all the keys are level. Then tighten the *set screw*. Form a small loop in the string with a loose end, place this over the set screw on the extension rod and tighten. Cut the excess string.

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[3] Richard Williams, Jeff King and Derrick Logozzo, *The Complete Instrument Reference Guide for Band Directors* (San Diego, CA: Neil A. Kjos Music Company, 2001), 35.

Tuning Slide Maintenance

Tuning slides are found on all brass instruments. Knowing how to dissasemble, lubricate, and assemble slides is essental to keep them moving freely and smoothly. It is essential to teach a beginnier how to lubricate tuning slides to avoid damage and frozen slides.

Step 1: Remove tuning slide(s) from the main body of the instrument. Valves should be depressed while removing and replacing tuning slides. *If tuning slides are frozen, seek help from a professional.*

Step 2: Clean and wipe all of the dirt and residue off of the tuning slide.

Step 3: Apply a liberal amount of tuning slide grease or *Vaseline* to the slide and rub in evenly.

Figure 10-6: Appling tuning slide grease *(Original photo)*

Step 4: Reassemble the tuning slide back into the body (with appropriate valves depressed), and move it back and forth to spread the lubricant evenly. Wipe away any excess lubricant.

Brass Maintenance and Cleaning Kit

Below are suggestions for a brass maintenance and cleaning kit. A maintenance kit is an important part of a music educator's inventory. This tool kit is designed for brass care and minor repair emergencies that a music educator would encounter in day-to-day events. The following brass maintenance kit contains minor repair tools, lubricants, cleaning tools and supplies, and miscellaneous supplies that pertain to brass instruments.

Maintenance Tools

- Mouthpiece puller
- Swivel top screwdrivers (various sizes)
- Rawhide/ Rubber mallet (small size)
- Cork knife (sharp knife)
- Needle-nose pliers (small/medium size)
- Tweezers

Lubricant Supplies

- Piston valve oil (recommended petroleum based)
- Rotary valve oil (recommended petroleum based)
- Linkage oil
- Trombone slide cream (recommended cream)
- Tuning slide grease (Vaseline will work)
- Water spray bottle

Cleaning Tools

- Mouthpiece brush
- Flexible Snake brush
- Valve brush (old toothbrush)
- Slide cleaning rod

Cleaning Supplies

- Dish soap (Dawn, Lemon Joy, etc.)
- Cheesecloth, lint free (old rags)
- Soft cloths, lint-free (dry horn)

- Brasso and Silvo (Miracle Cloth)

Miscellaneous Supplies

- Valve stem corks
- Valve stem felts
- Rotary valve string
- Water-key corks (cork cement/wet & dry sandpaper)
- Water key springs
- Piston valve springs
- Sousa bell screws

Minor Brass Repairs

Minor repairs are procedures that can be performed by a trained music educator without the assistance of a professional instrument repair technician. Two of the most common repairs are stuck mouthpieces and changing damaged water key corks. The following will offer clear and concise approaches to minor brass repair.

Stuck Mouthpiece

Mouthpieces on brass instruments occasionally will get stuck. Trying to "muscle" the mouthpiece out of the horn can bend the leadpipe or break a brace, badly damaging the instrument. A mouthpiece puller is the best tool for removing a stuck mouthpiece. The following will offer a step-by-step approach to removing a stuck mouthpiece.

Step 1: Place the instruments on a flat surface, larger instruments like the euphonium and tuba may need some assistance.

Step 2: Place the mouthpiece puller over the mouthpiece lining the bottom V-shaped clips against the leadpipe. The cup of the mouthpiece will rest in the U shaped cup of the puller.

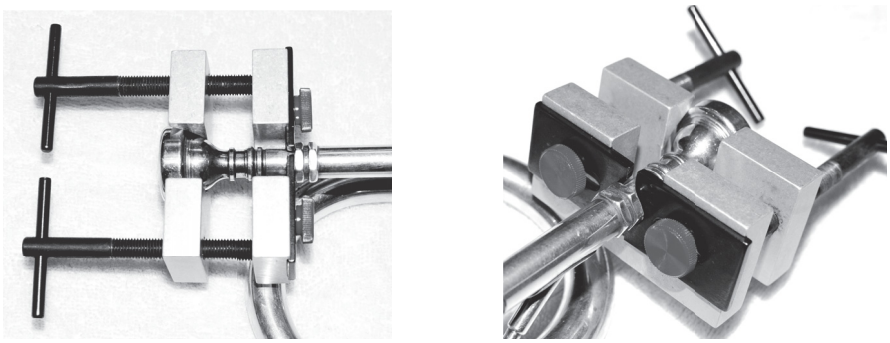


Figure 10-7: Using a mouthpiece puller *(Original photo)*

Step 3: Tighten the clips.

Step 4: Slowly turn the screw handles on the top, alternating between the screws. Tension will build and the stuck mouthpiece will pop out. The mouthpiece and instrument will remain undamaged.

Changing a Water Key Cork

Brass instruments have water keys, often referred to as "spit valves," which allow the draining of the condensation. Most water keys have corks to provide the seal, but as cork gets old; it can crack and break, and loosen the seal. When a water key cork is not sealing properly, a brass instrument's tone becomes very raspy and it is hard to play in tune. The following offers a step-by-step approach to replacing a water key cork.

Step 1: First remove the old cork. Scrape out old remnants of the cork and glue from the water key cradle.

Step 2: Water key cork comes in various sizes: use a cork that is slightly larger than the cradle and sand it down to size. This will allow the cork to fit snugly in the cradle.

Step 3: Put a tiny drop of *Elmer's* glue on the back of the cork and place into the cradle. Close the water key and check for a tight seal. Sand the cork if needed to shape the surface to allow a seal.

Cleaning a Brass Instrument

At least once a year, brass instruments should be taken apart and thoroughly cleaned. Cleaning a brass instrument is a three-stage process. Use a bathtub or deep-sink; place a rubber mat or a towel on the bottom to protect the finish of the instrument. **Never use hot water, as this can severely damage the lacquer finish on a brass instrument!**

First Stage

Step 1: Remove all tuning slides, valves, springs and any other movable parts of the instrument. Most valves and slides are marked with numbers to indicate where they belong, if not, lay out the parts and label them for reference when putting the instrument back together.

Step 2: Disassemble each piston valve by removing all pads, corks, and finger buttons.

Step 3: Soak and clean each valve and slide individually in lukewarm water with mild liquid dish soap. Clean slides using a soft brush (an old tooth brush) to clean the inside and outsides of the slide, making sure to remove all of the grease from the old lubricants. Clean the oxidation and corrosion from slides using *"Brasso"* on the brass slides and *"Miracle Cloth"* for nickel slides.

Step 4: After the valves and slides have been cleaned, wipe dry with a soft lint-free cloth.

Second Stage

Step 1: Soak the main body of the horn in the tub or deep-sink with lukewarm water and dish soap.

Step 2: Flush out the inside of body with cleaning snakes and soft brushes. Clean the lead pipe, valve casings, and slide casing. Thoroughly remove all old lubricants, sediments, and sludge, which accumulate throughout the instrument. Rinse often throughout the cleaning process.

Step 3: Drain all of the water out of the instrument. When the body is properly cleaned and flushed out, dry with a soft cloth to prevent scratching of the instruments finish.

Third Stage

Step 1: Re-assemble the brass instrument. Lubricate the slides: commercial lubricants are available, but substitutes range from petroleum jelly to axle grease. Apply a small amount of lubrication on the slide and work it into the horn.

Step 2: Re-assemble the valves. The thicknesses of the pads/corks are important for the alignment of the piston valves. Lubricate the valves: commercial lubricants are available, both natural oil and synthetic oil. Synthetic oil is thicker oil that does not break down as fast as natural oil. **As a precaution, avoid combining synthetic and natural oils— they do not mix!** Apply a small amount of oil to the valve, careful not to touch the oiled section, and then return to the casing. When working with rotary valves, be sure you have learned how to remove, clean and put them together from a repairman. The removal and cleaning of rotary valves should be done at least once every couple of years.

Chapter Summary

This chapter provided future music educators with a resource manual for care and maintenance of brass instruments. It is important for the music educator to be able to perform the aforementioned maintenance procedures and to be able to teach these procedures to beginners. This chapter provides an overview of the following: piston valve maintenance; trombone slide maintenance; rotary valve maintenance; stringing a rotary valve; and tuning slide maintenance. This chapter also offers suggestions for a brass maintenance and cleaning kit, how to clean a brass instruments, and make minor repairs. Students will have the knowledge to teach brass more effectively and will be able to problem-solve should issues arise with the instrument. This important chapter provided the music education student clear and concise approaches to brass care and maintenance, which will expand the student's working knowledge of brass instruments. Understanding the care and maintenance of brass instruments is an important part of being an instrumental music educator.

Chapter 11

Brass Performance Exercises

The focus of this chapter is designed to aid in the development of good individual and ensemble tone production and intonation. The purpose of this chapter is to provide material for tone production, intonation, technique, musical line, balance, and blend in a brass ensemble setting. The first section of the chapter will concentrate on unison routine and technique exercises. The unison studies are designed to teach better air support, tone, and phrasing, while building endurance and embouchure strength. The chapter continues with a collection of short chorales and melodies arranged for beginner and intermediate brass ensembles. The chorales are designed to teach phrasing, balance, and blend while improving tone and intonation. The chapter closes with arrangements of standard wind band literature for brass ensemble. The collection represents a variety of musical styles, hymns, composers, and folk songs found in today's wind band literature. They serve to develop the fundamentals of brass performance and introduce music educators to today's wind band literature.

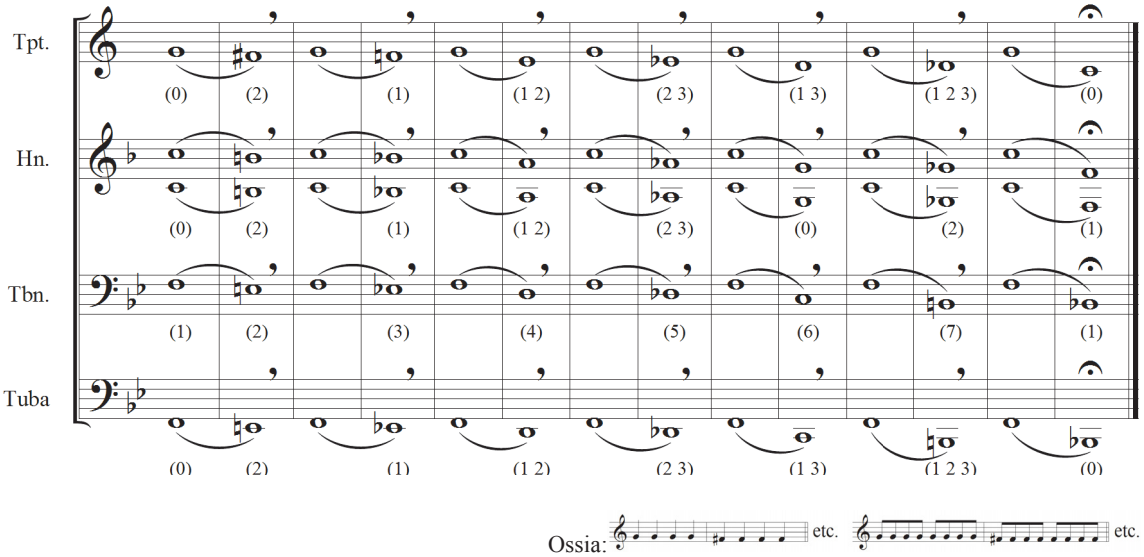
Unison Routine and Technique Exercises

The following are selected routine and technique exercises which have been derived from leading brass method and etude books. A number of brass teachers have found these exercises to be particularly useful for daily practice. Each exercise focuses on specific aspects of brass performance that develop tone production, flexibility, endurance, articulation, and technique. The exercises contain long tones studies, legato and lip slur studies, technique studies, tonguing and multiple tonguing. The author has arranged and

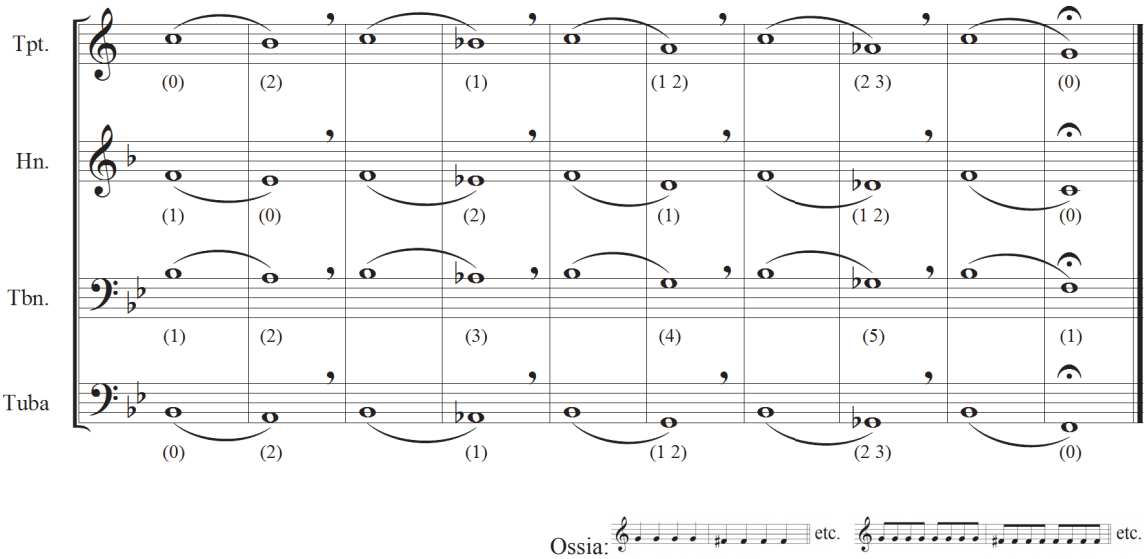
varied each exercise for beginner brass class. The third line in each exercise should be for trombone and euphonium.

Long Tone Routine

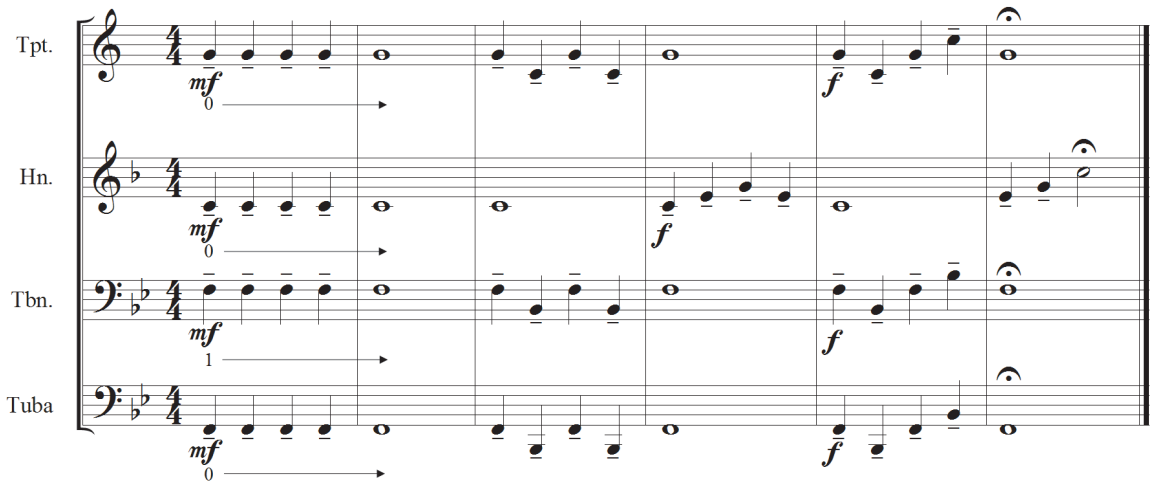
#1. Emory Remington Daily Routine: Variation I



#2. Emory Remington Daily Routine: Variation II

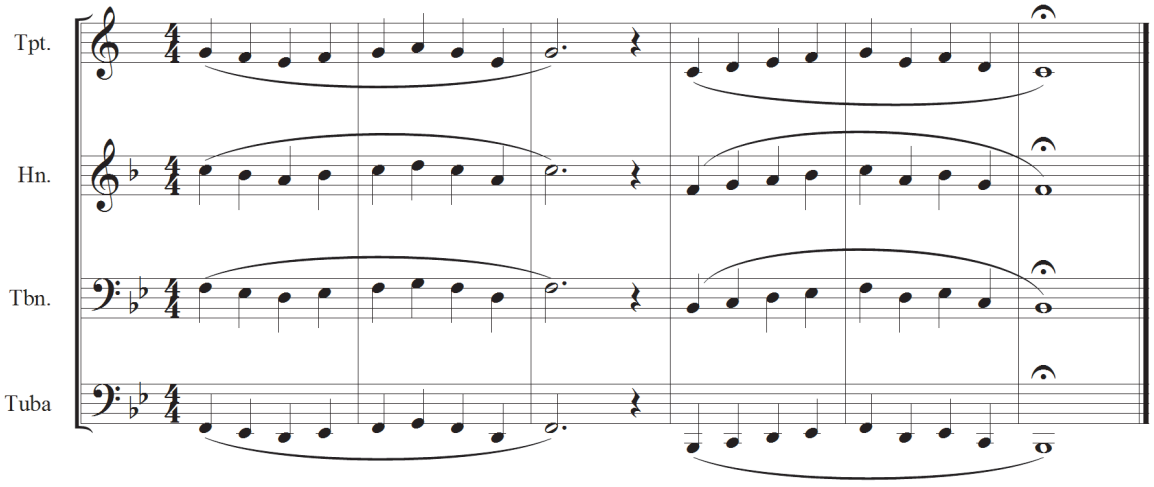


#3. Jay Zorn Ensemble Study I

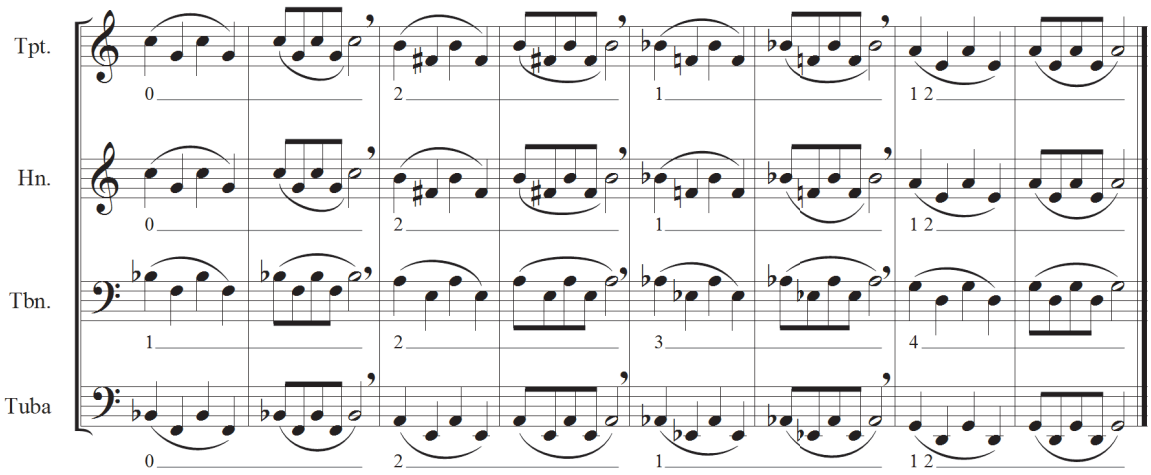


Flow Studies and Lip Slurs:

#4. Flow Study I

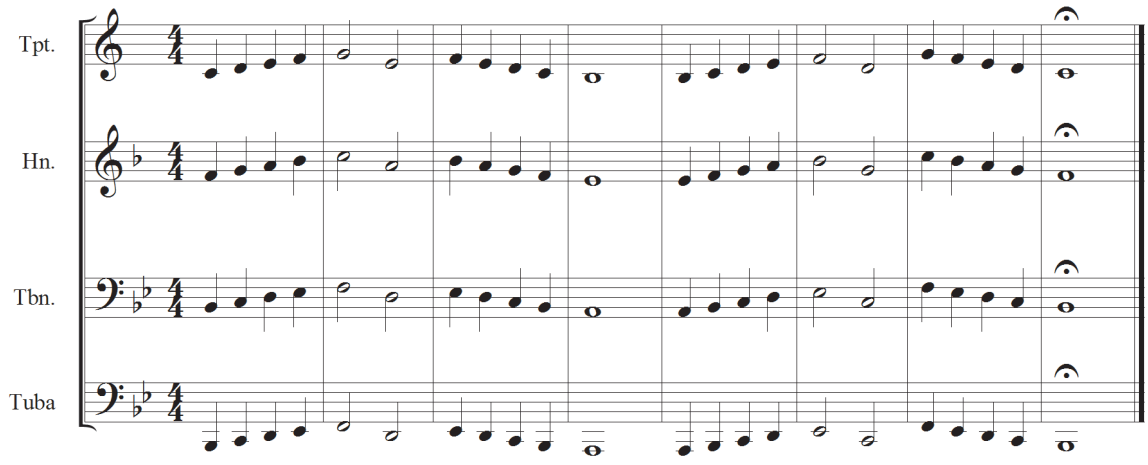


#5. Max Schlossberg Daily Drill

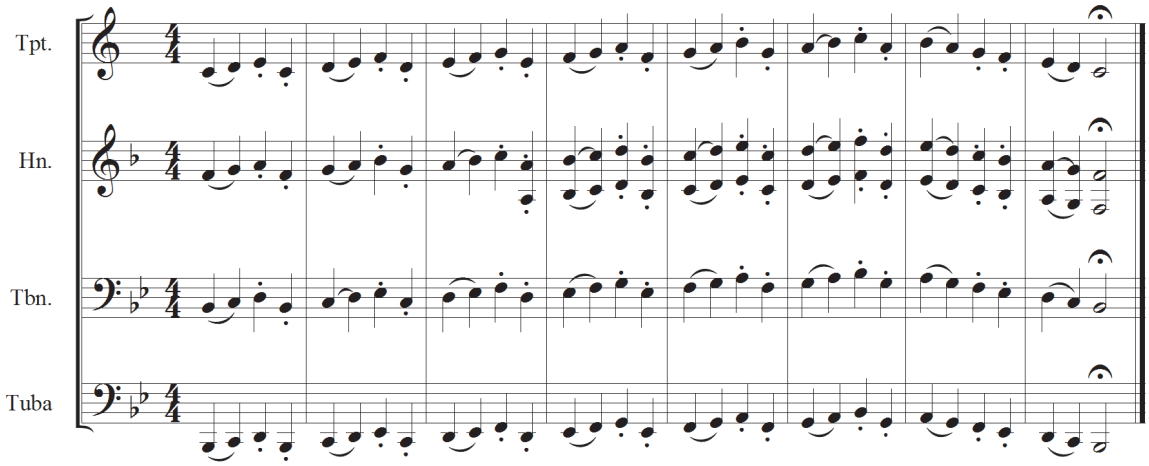


Technique Studies

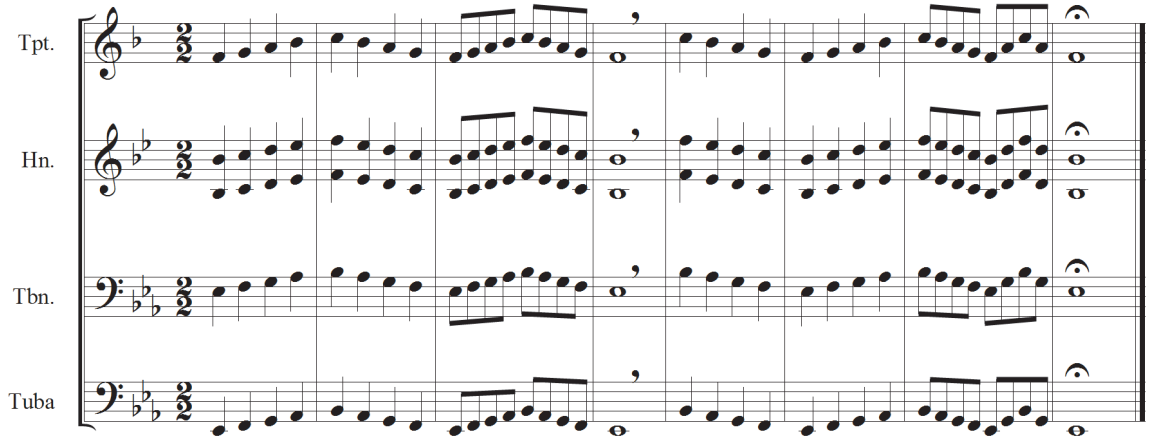
#6. Jean-Baptiste Arban Study I



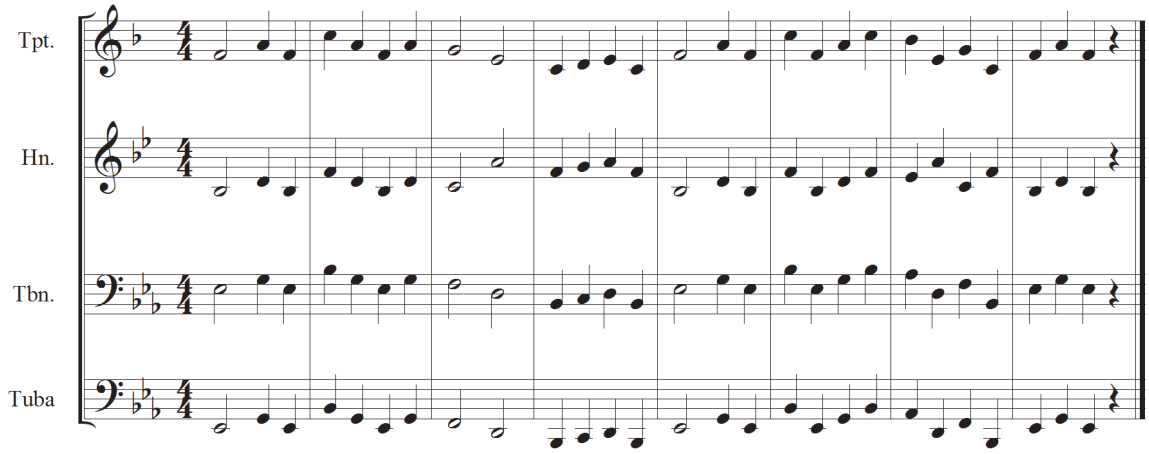
#7. Gordon-Clark Study I



#8. Gordon-Clark Study II

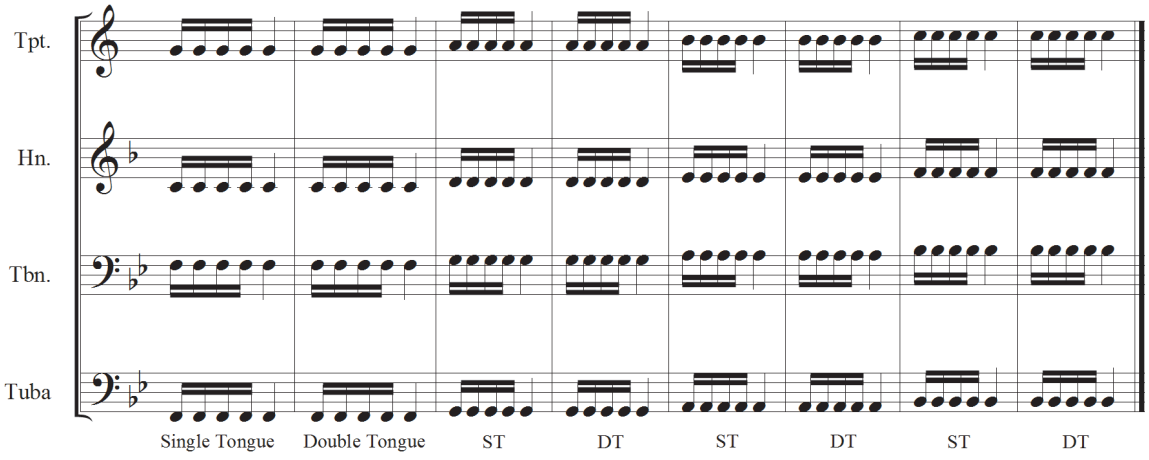


#9. Jean-Baptiste Arban Study II

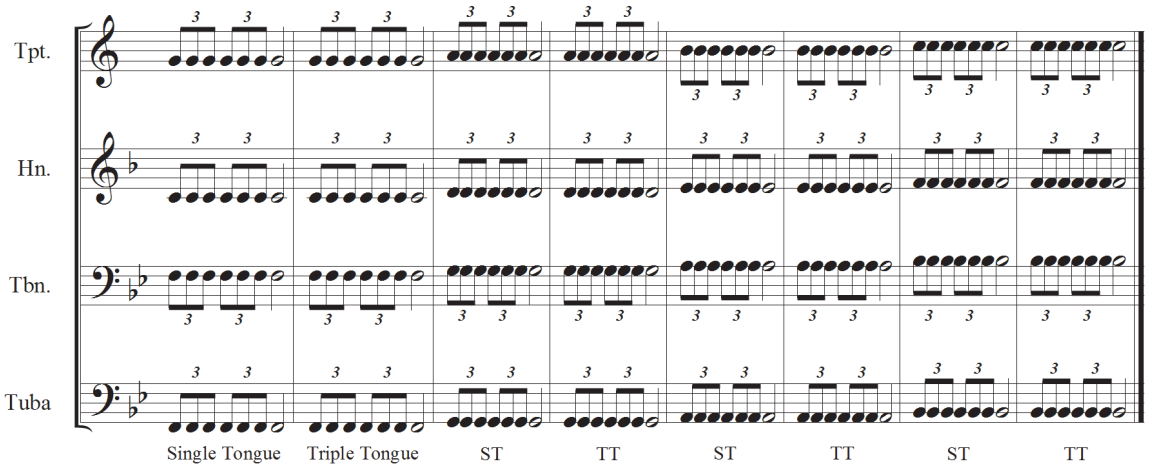


Multiple Tonguing Drills

#10. Double Tonguing



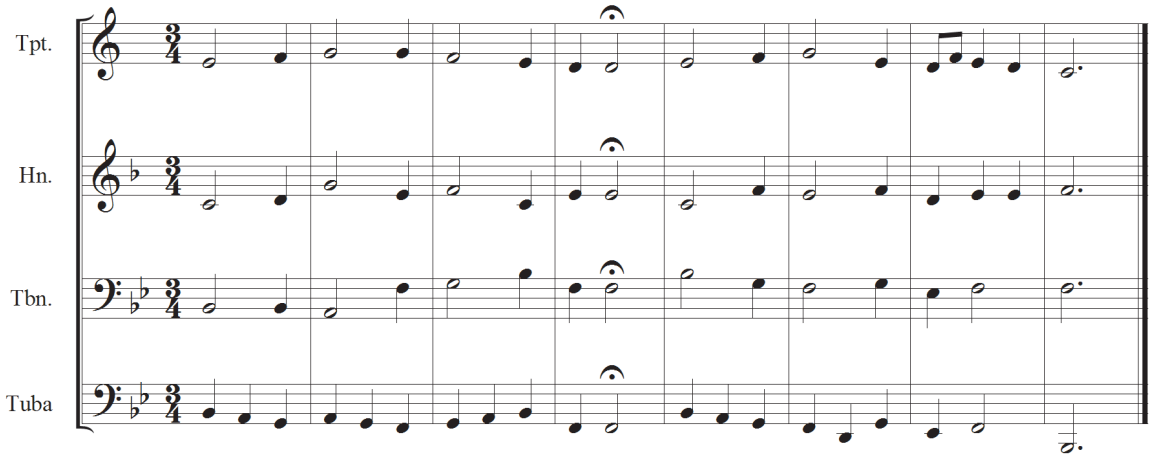
#11. Triple Tonguing



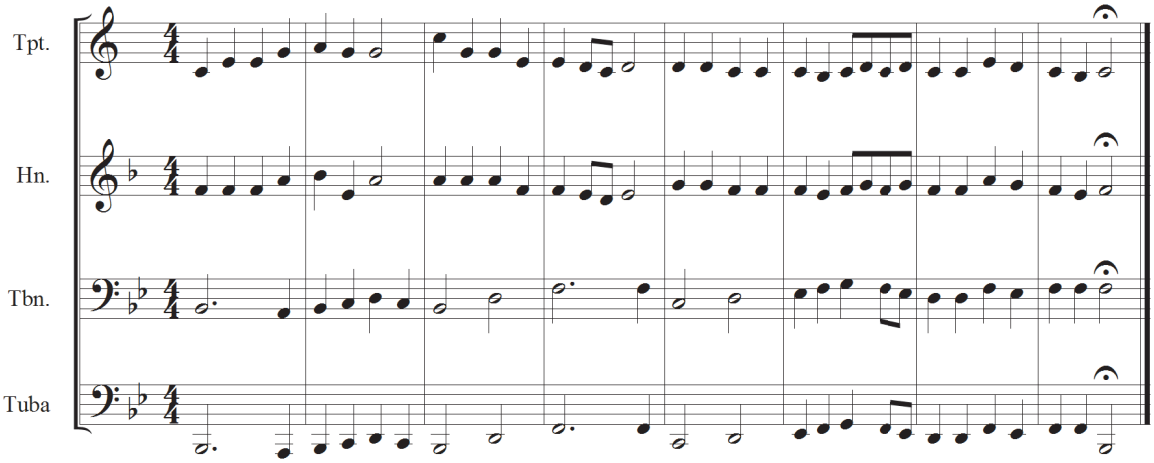
Short Ensemble Chorales and Melodies

The following are four-part settings of short chorales and melodies. They are designed to introduce brass ensemble performance and are arranged for beginner and intermediate brass ensembles. The chorales focus on phrasing, balance, and blend while improving tone and intonation. The author has arranged the following chorales and melodies for a beginning brass class. The third line in each exercise should be for trombone and euphonium.

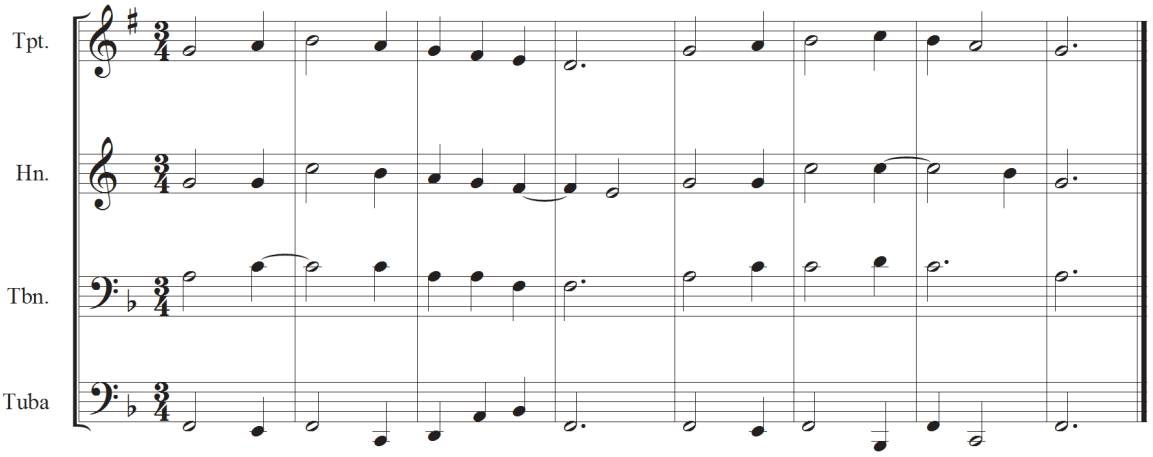
#1. Jesu, Joy of Man's Desiring – J. S. Bach (1685-1750)



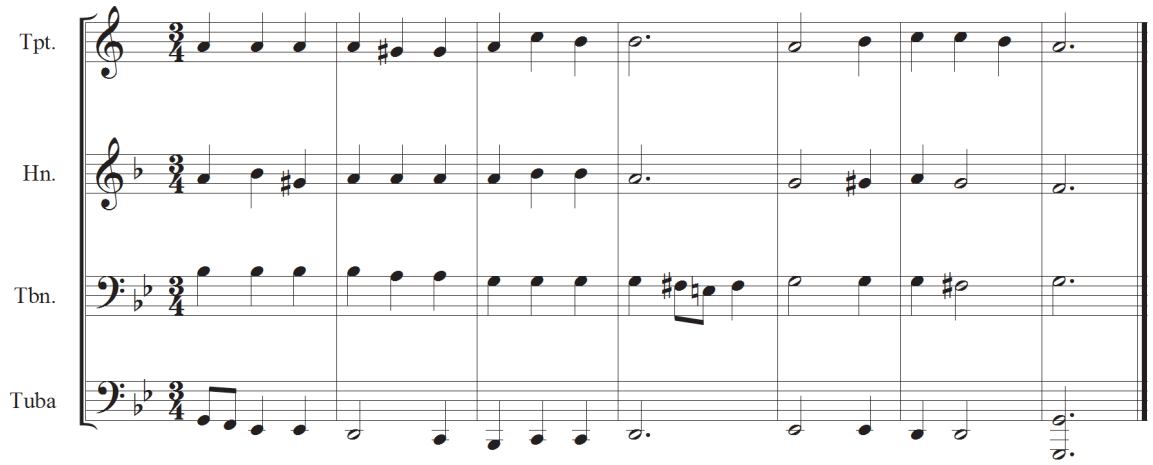
#2. Evening Prayer from *Hansel and Gretel* – Engelbert Humperdinck (1854-1921)



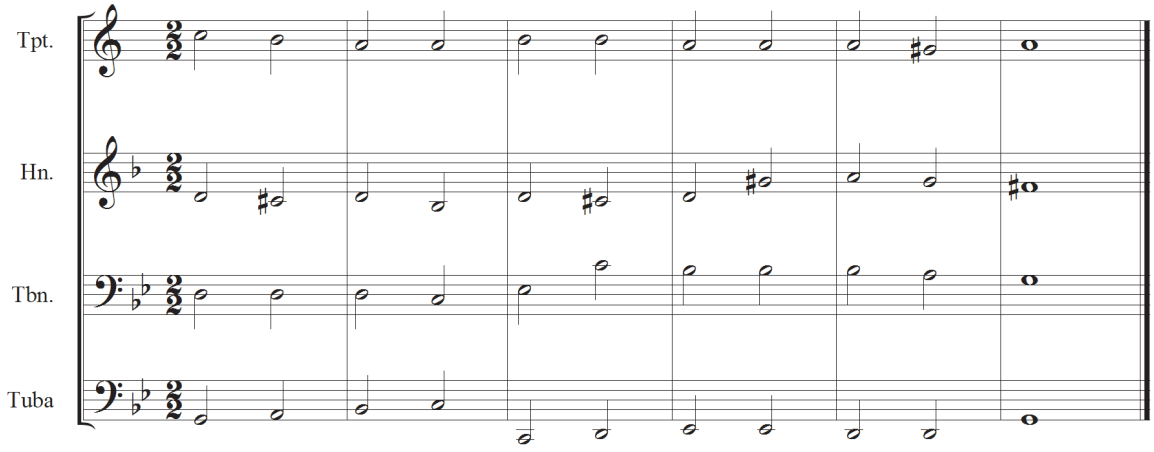
#3. Rejoice greatly, O my soul – Johann Pachelbel (1653-1706)



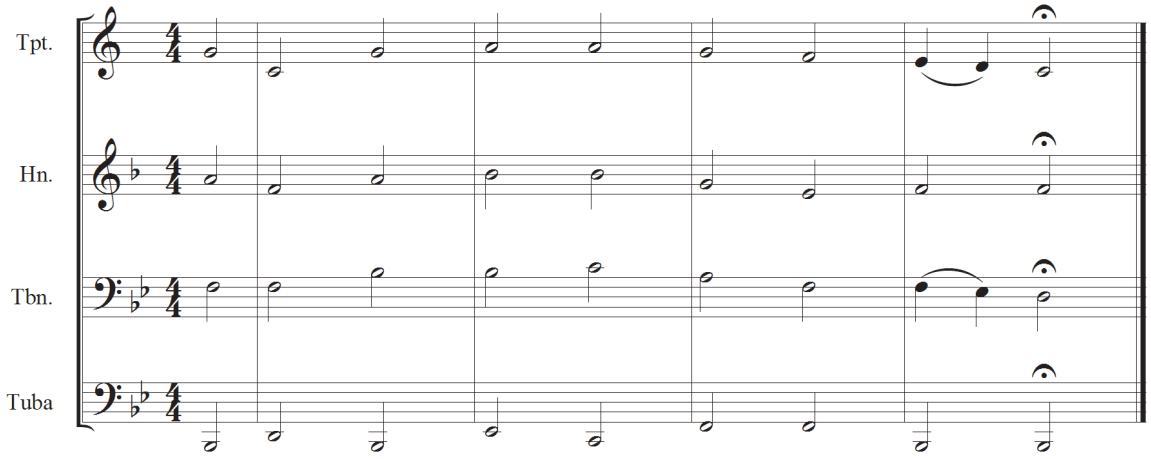
#4. Chorale Tune I – Anonymous



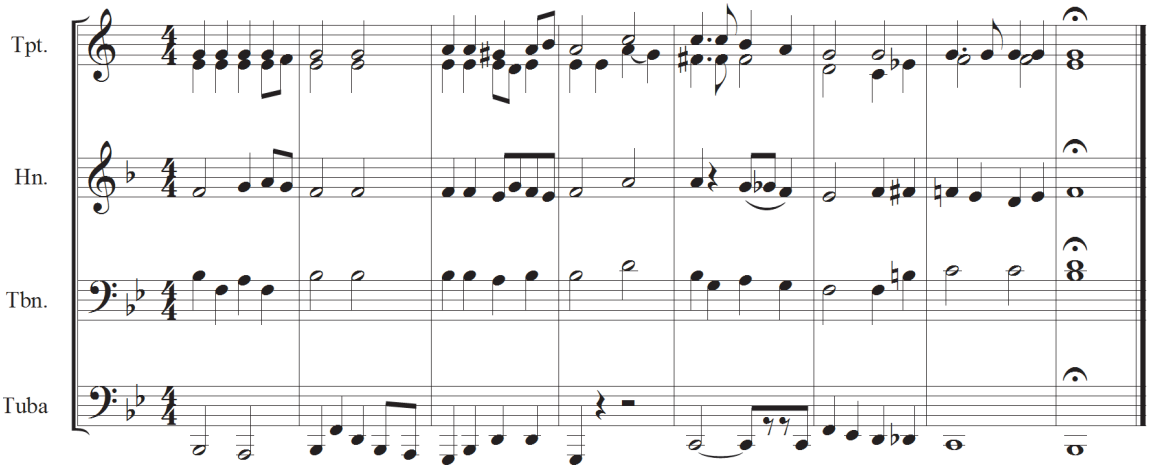
#5. Chorale Tune II – Anonymous



#6. To Thee, Jehovah, I will sing – Anonymous



#7. Chorale from *"Lip Benders"* – Ray E. Cramer

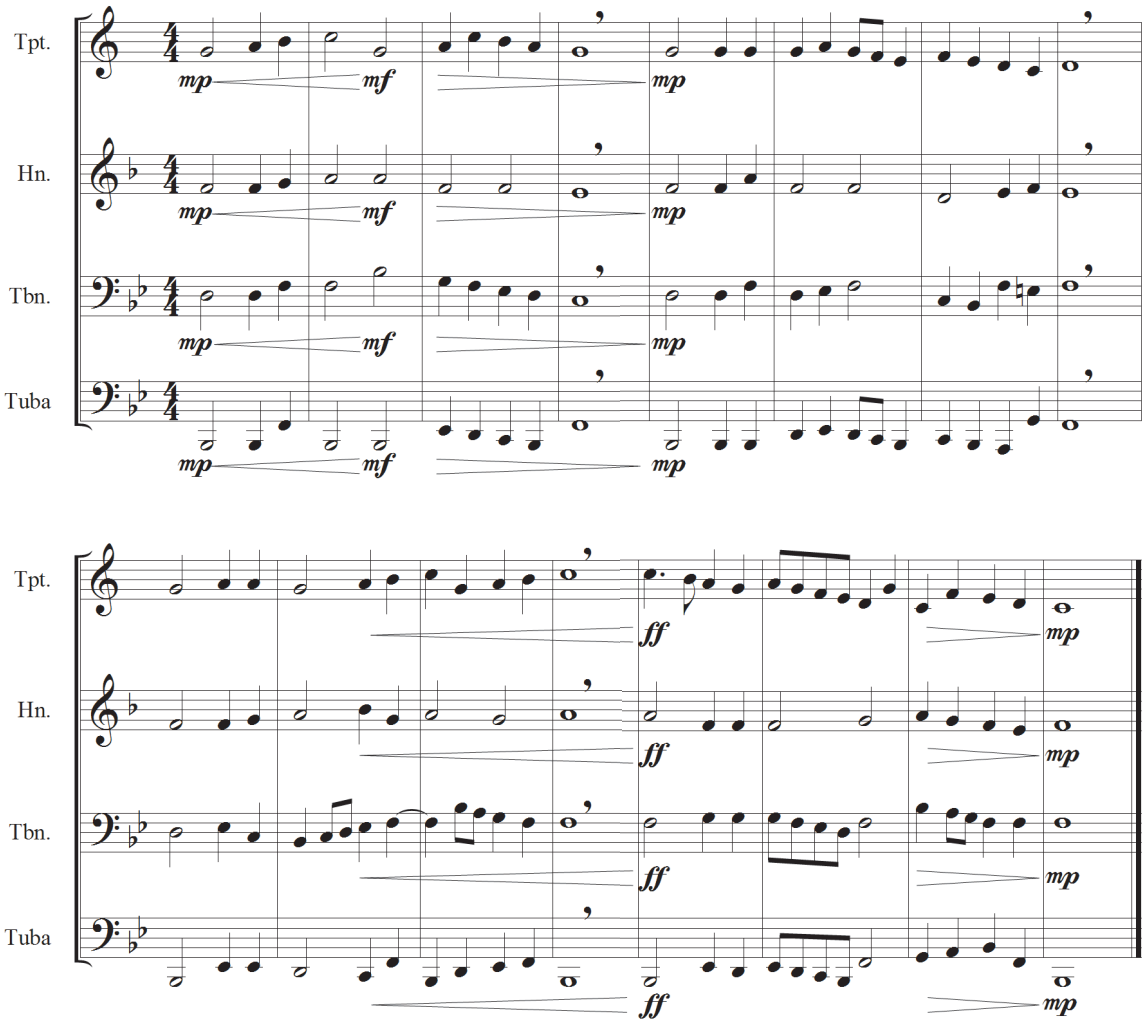


Brass Ensemble and Wind Band Literature

The following are standard wind band literature arrangements for beginning brass ensemble. The collection represents a variety of musical styles, hymns, composers, and folk songs found in today's wind band literature. They serve to develop the fundamentals of brass performance and introduce music educators to today's wind band literature. The third line in each exercise should be for trombone and euphonium.

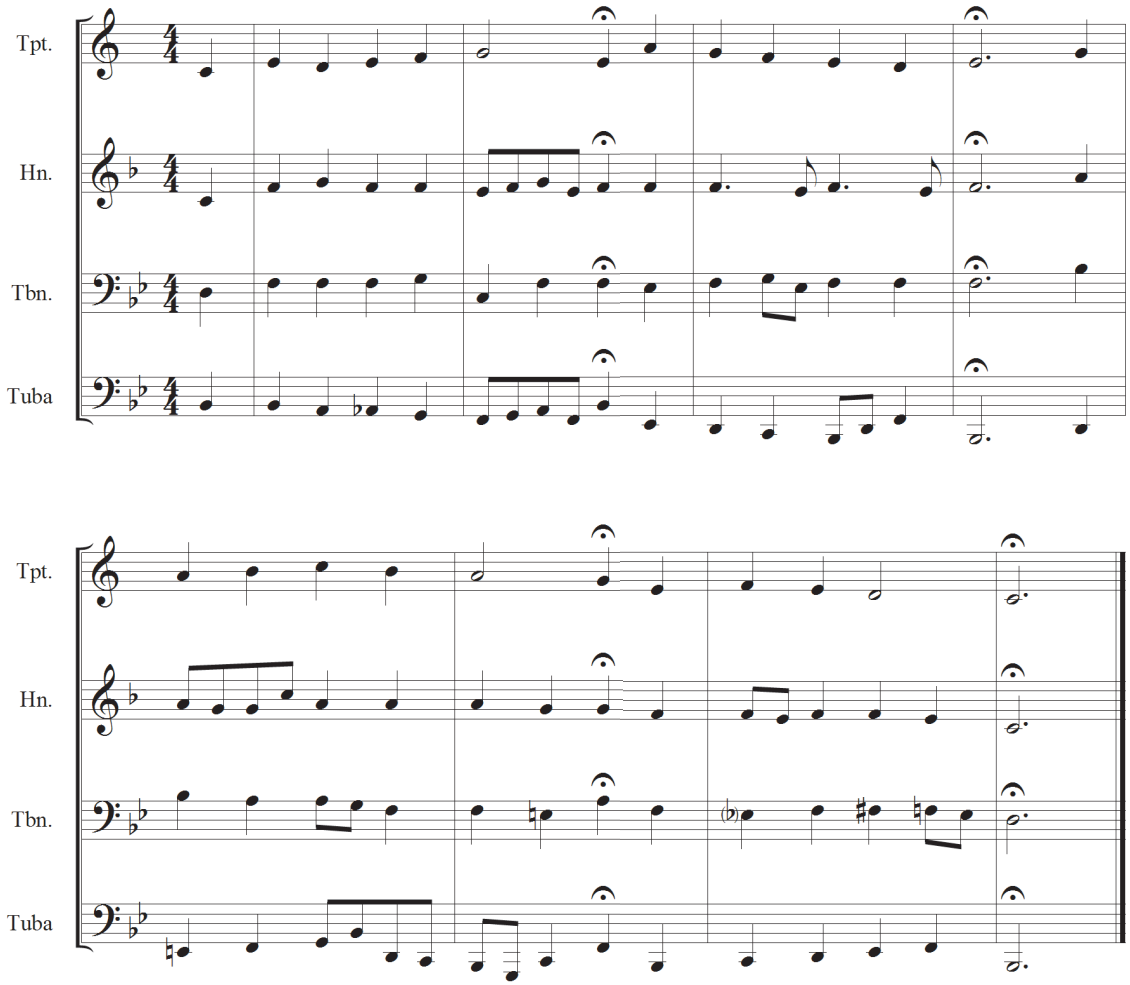
Chester
from *The Singing Master's Assistant*

William Billings (1746-1800)



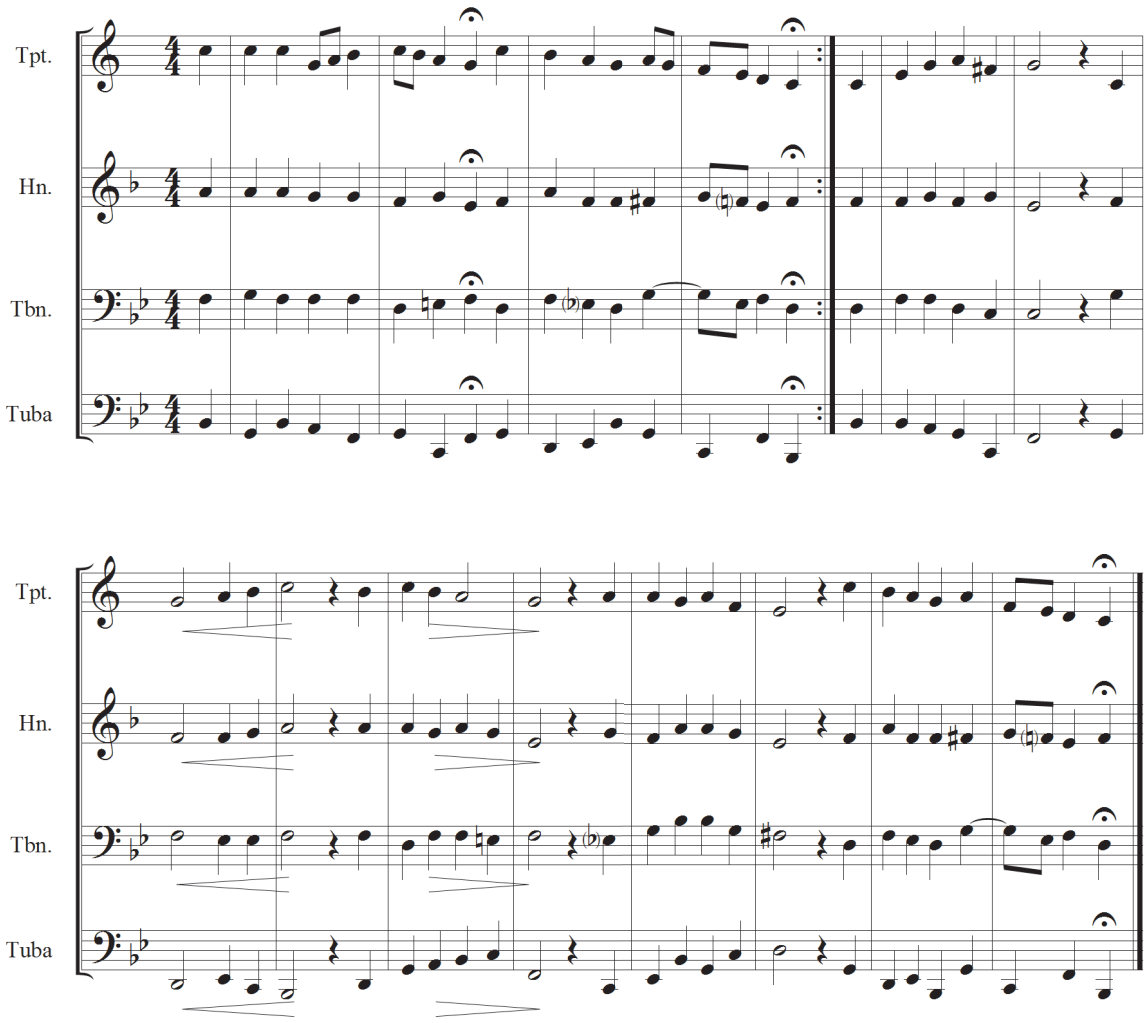
Christ Is My Life

Johann Sebastian Bach (1685-1750)



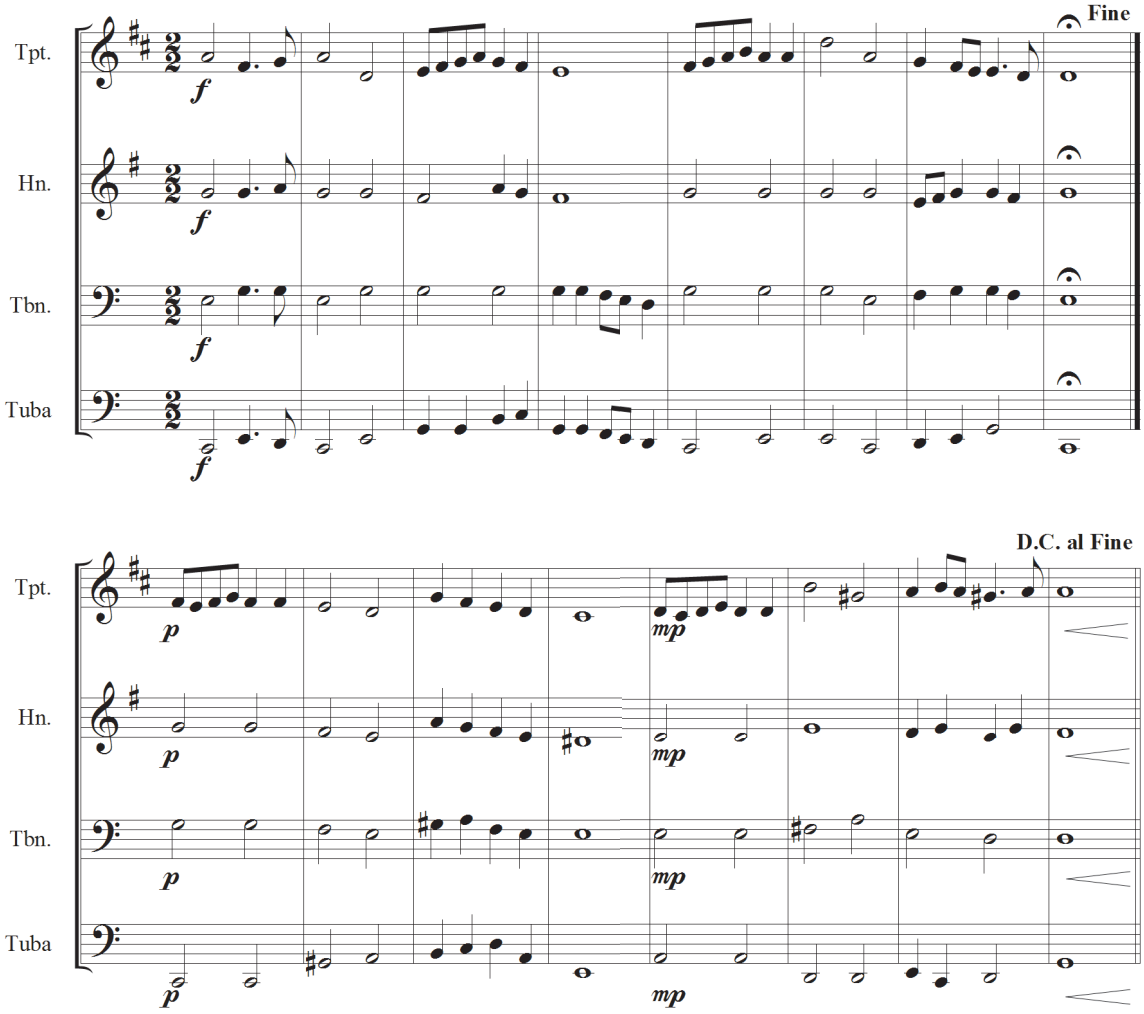
A Mighty Fortress is Our God

Martin Luther (1483-1546)



Thine be the Glory
from the oratorio *Judas Maccabeus*

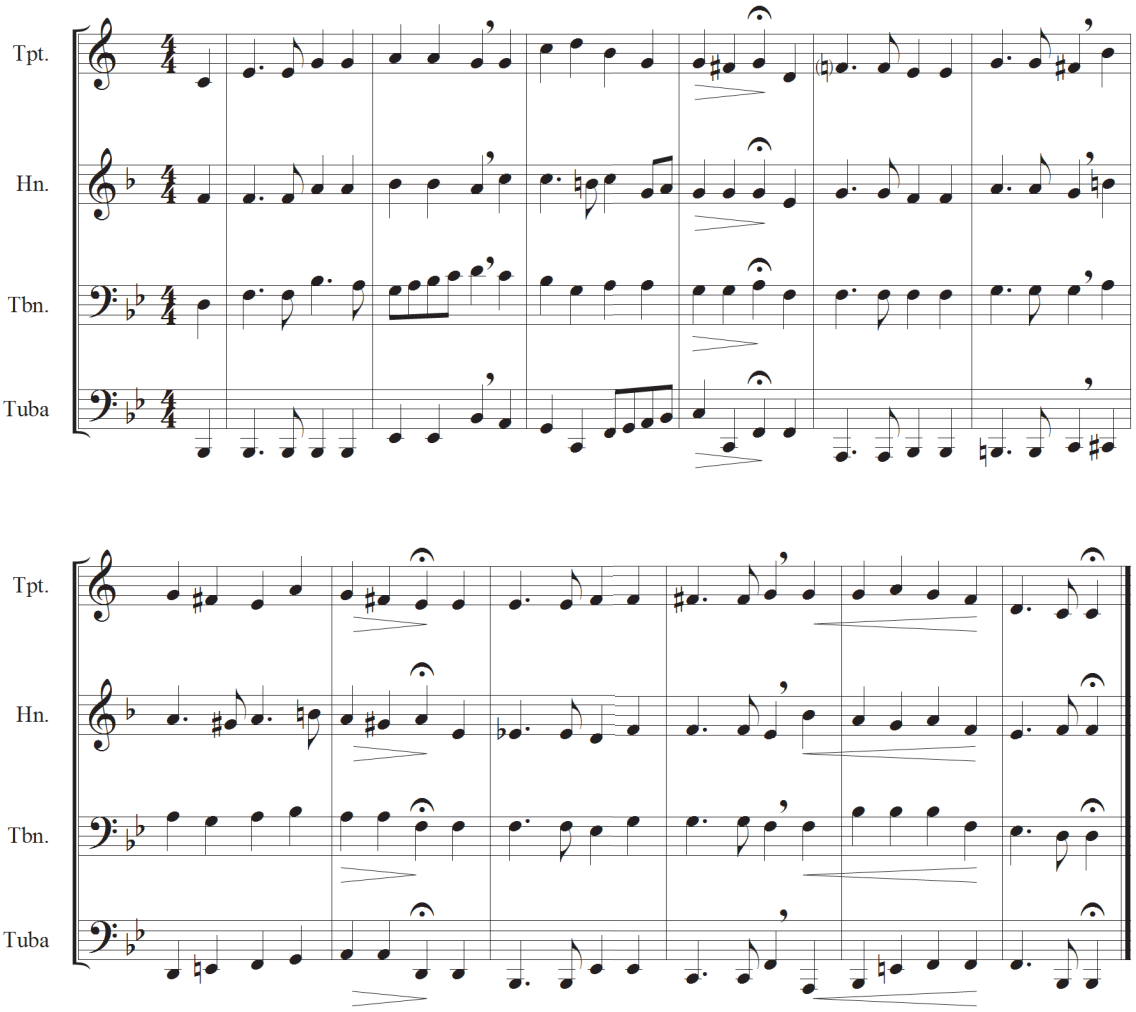
George Fredric Handel (1685-1759)



The Navy Hymn

Eternal Father, Strong to Save

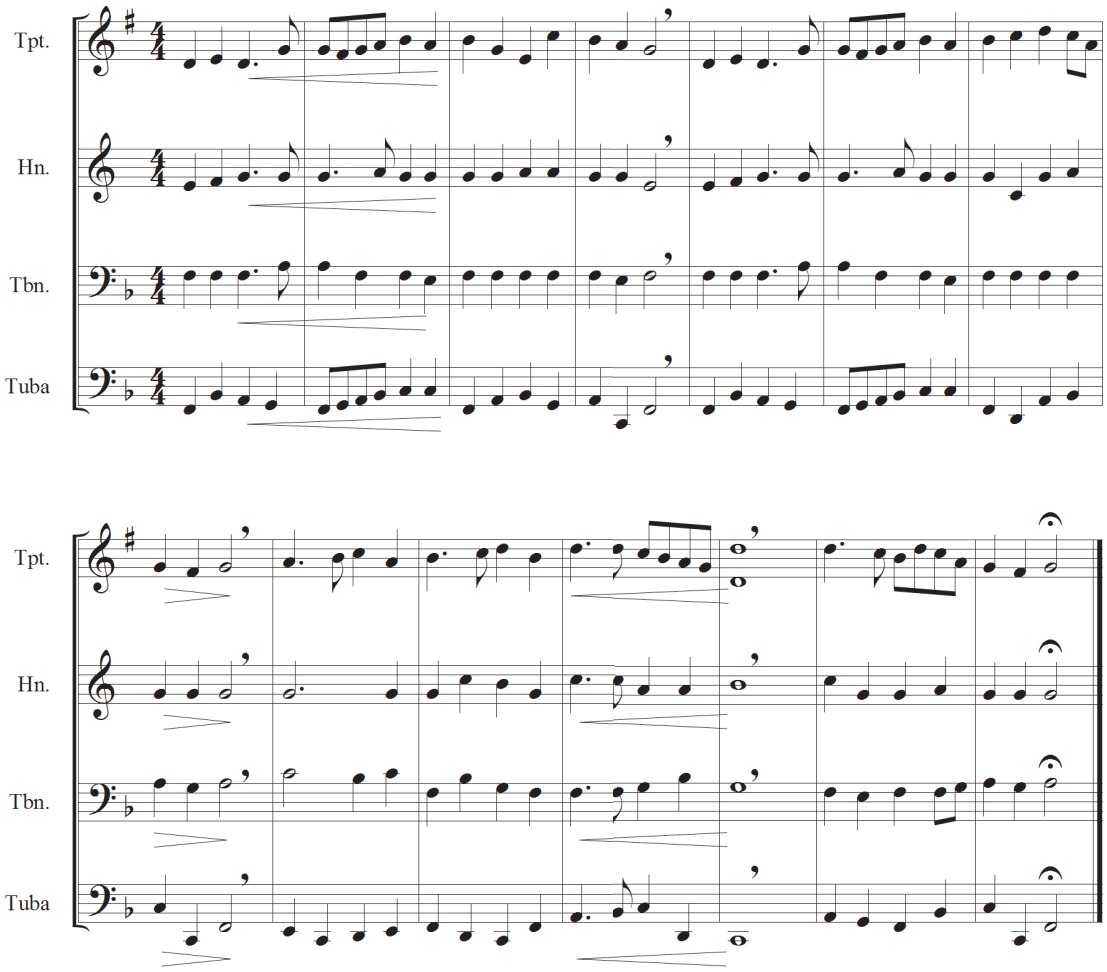
John B. Dykes (1823-1876)



Cwm Rhondda

God of Grace and God of Glory

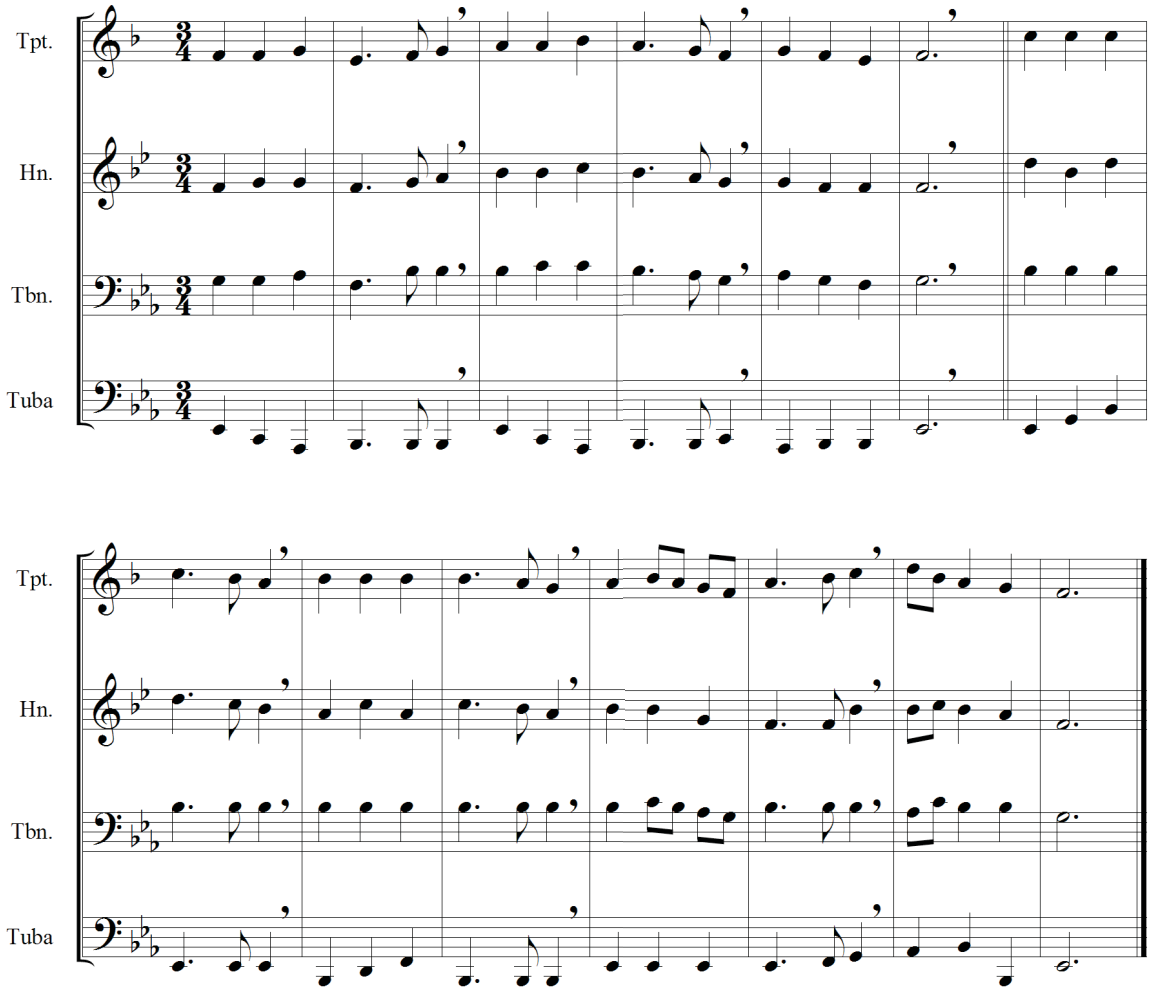
John Hughes (1873-1932)



America

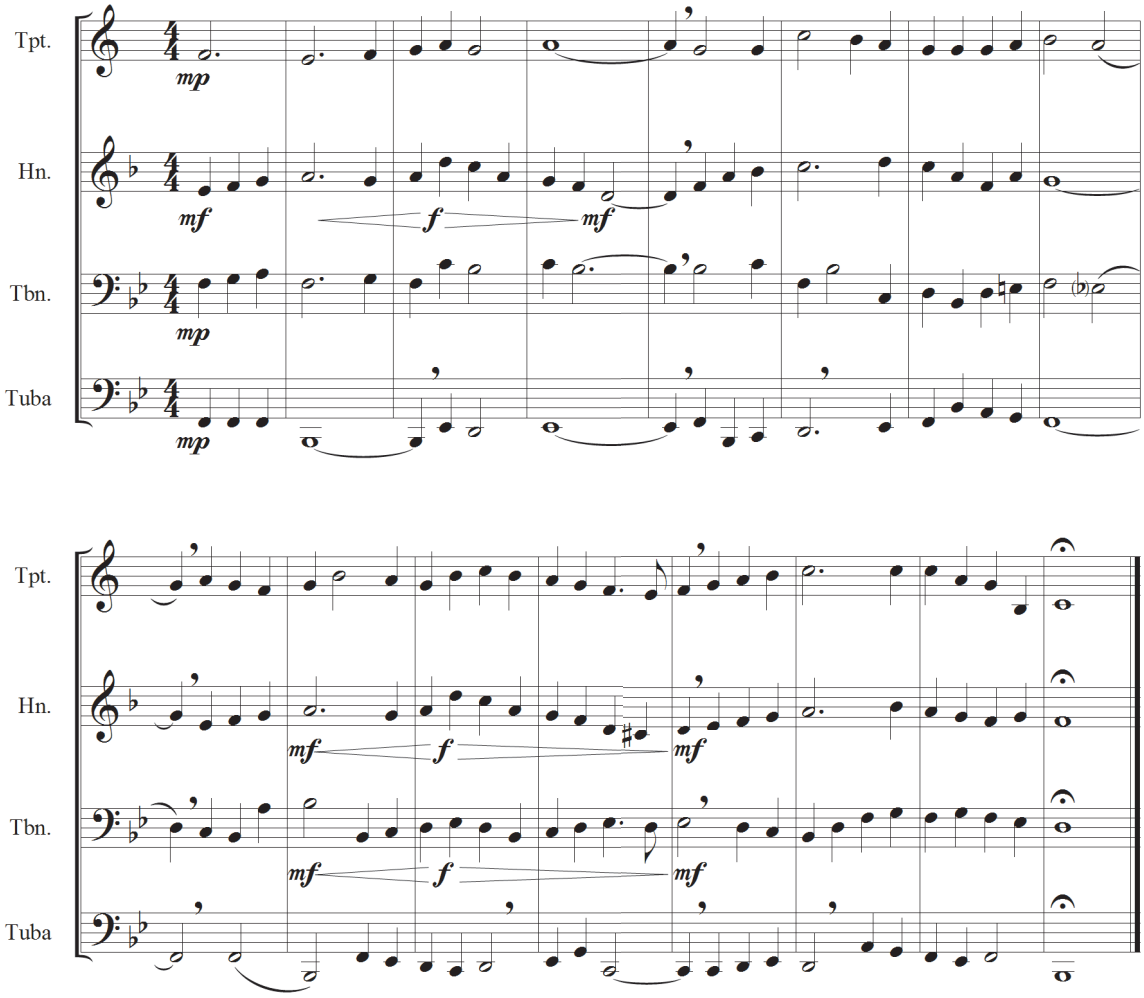
My Country tis of Thee

American Patriotic Song



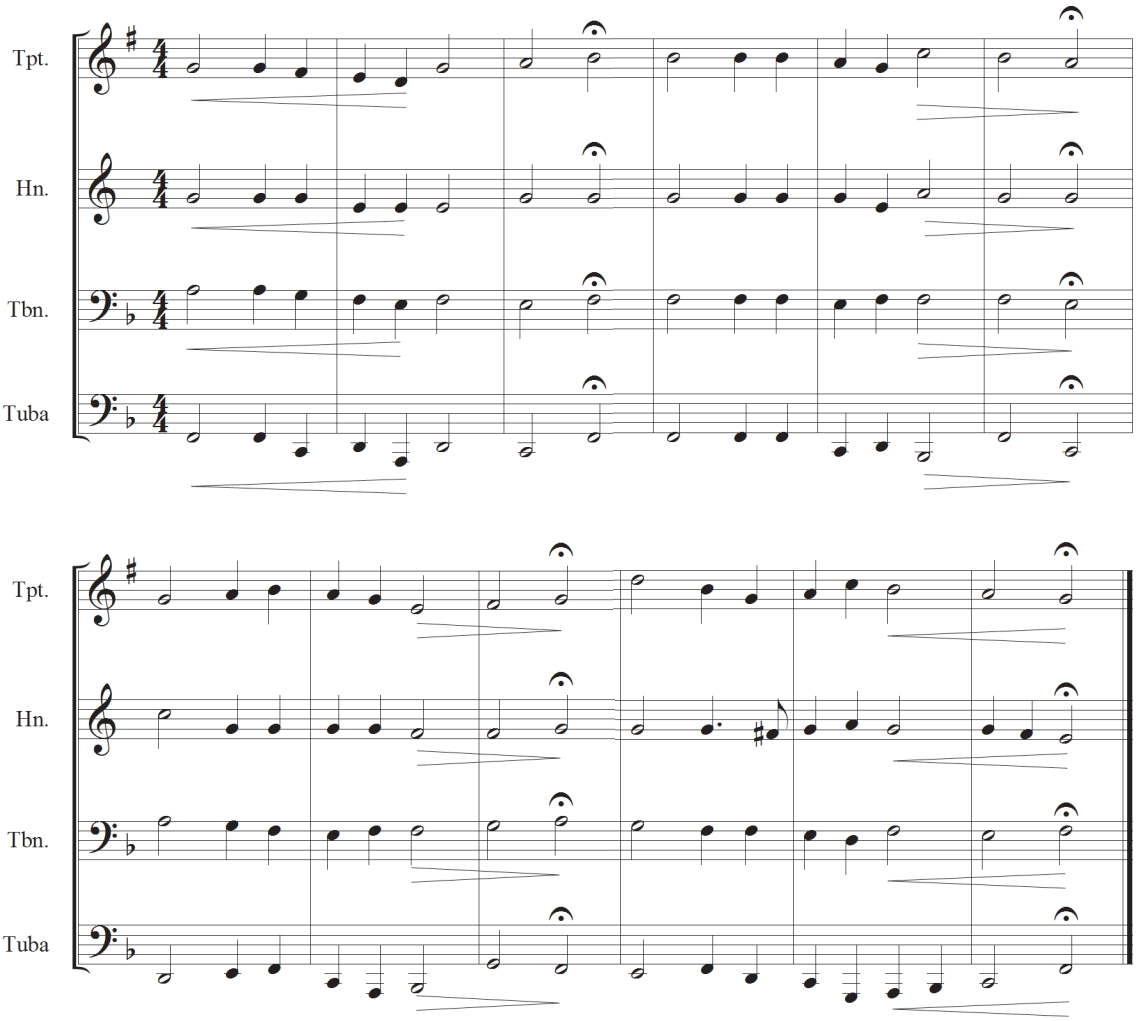
Irish Tune from *County Derry*
(Londonderry Air)

Percy Aldridge Granger (1882-1961)



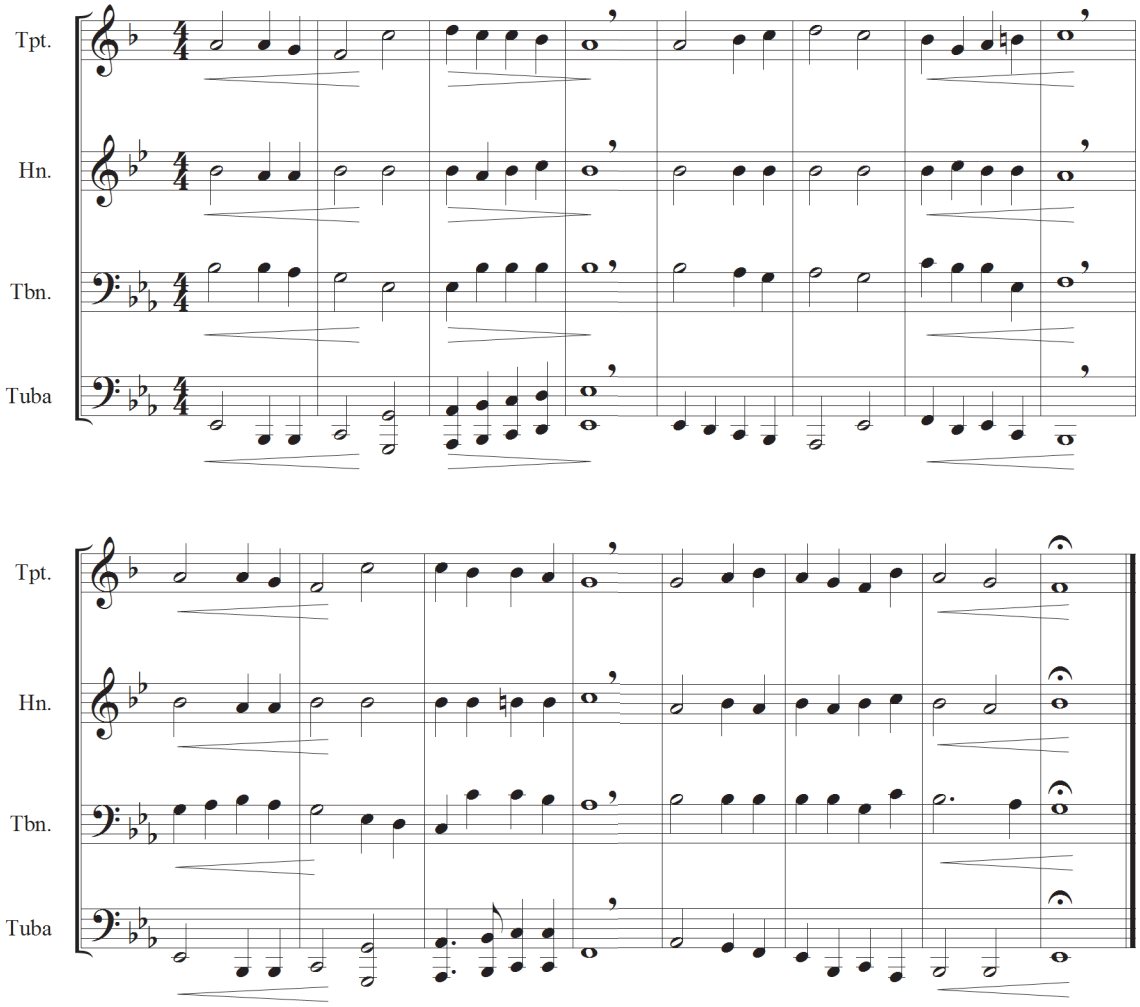
Old Hundredth

Loys Bourgeois (c.1510-c.1560)



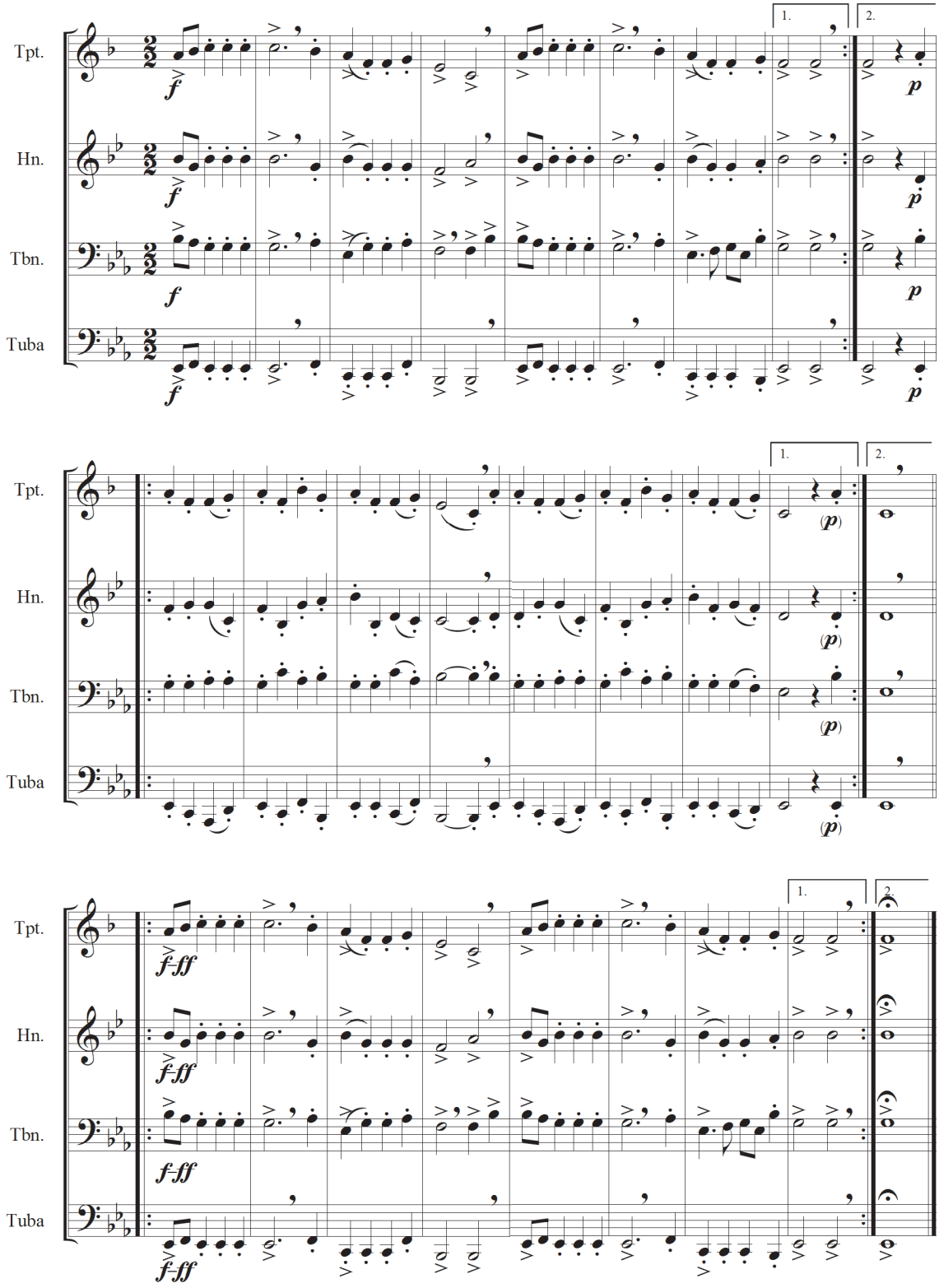
Abide with Me

William H. Monk (1823-1889)



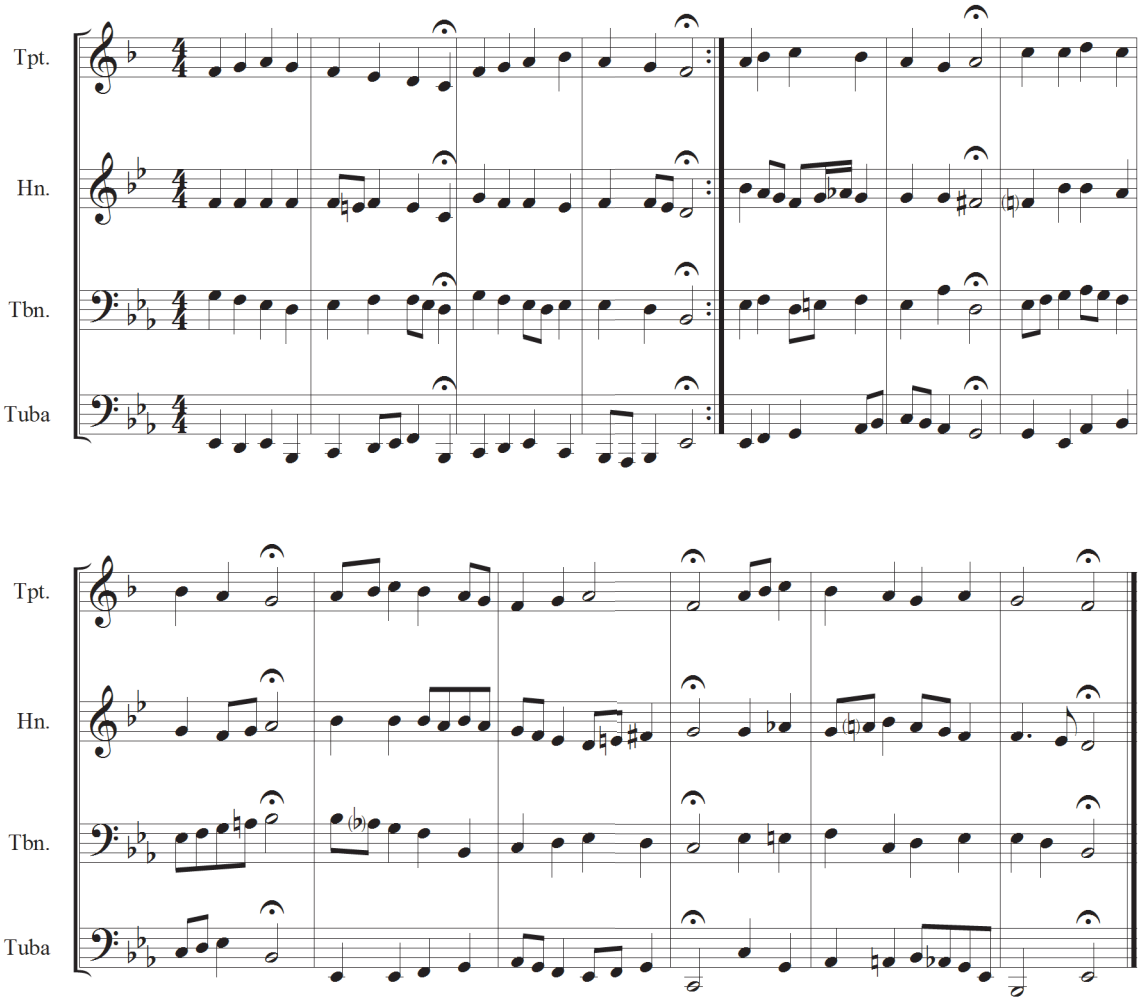
Dance
from *Danserye*

Tylman Susato (c.1510-c. 1570)



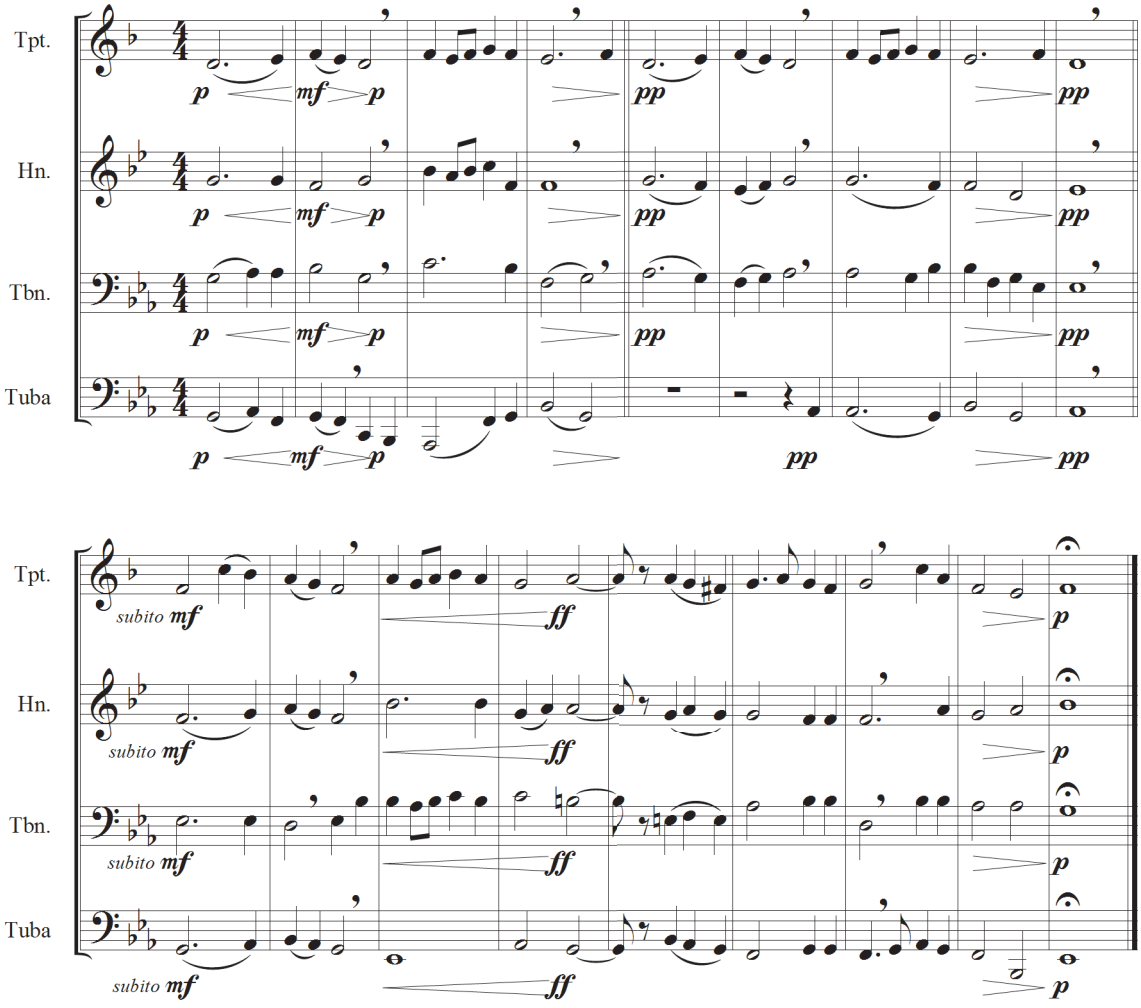
Rejoice greatly, O my soul

Johann Sebastian Bach (1685-1750)



Salvation is Created

Pavel Tchesnokov (1877-1944)



Appendix

Evaluating Performance and Teaching Forms

Lesson Observation Form

Brass Performance Exam Requirements

Brass Performance Evaluation

Name: _____ Instrument: _____ Date: _____

1	2	3	4	5
(Low)				**(High)**

1. Performance Concepts _____ (score)
   - proper embouchure formation
   - demonstrate proper posture and instrument placement
   - demonstrate correct breathing technique and airflow
   - performs with a characteristic tone quality

2. Prepared Scales _____ (score)
   - accurate sense of time and beat
   - performs correct notes
   - demonstrates fluency of scale

3. Assigned Etudes _____ (score)
   - demonstrates range of the instrument with facility
   - creates a musical line or phrase
   - performs correct rhythms and pitches
   - performs correct dynamics and articulations

4. Student Selected Solo _____ (score)
   - demonstrates range of the instrument with facility
   - creates a musical line or phrase
   - performs correct rhythms and pitches
   - performs correct dynamics and articulations

5. Sight Reading _____ (score)
   - demonstrates range of the instrument with facility
   - creates a musical line or phrase
   - performs correct rhythms and pitches
   - performs correct dynamics and articulations

Total Score: _____

Brass Teaching Evaluation

Teacher: _____ Student: _____

Instrument: _____ Date: _____

\+ **Excellent**
√+ **Very Good** (only minor corrections)
√ **Good** (some work needed)
√- **Satisfactory** (more work and review needed)
– **Deficiency**

Low----------High

Fundamental Concepts:	1	2	3	4	5	6	7	8	9	10
_____ Posture/Breathing:										
_____ Embouchure Formation:										
_____ Mouthpiece Placement:										
_____ Mouthpiece Buzzing:										
_____ Tonguing/Articulation:										
_____ Assembling/Holding Instrument:										

Performance Concepts:	1	2	3	4	5	6	7	8	9	10
_____ Concept of Sound:										
_____ Producing Partials:										
_____ Using Valves/Slide:										
_____ Reading Music:										

Teaching Techniques:	1	2	3	4	5	6	7	8	9	10
_____ Organization/Pacing:										
_____ Modeling/Imitation:										
_____ Communication:										
_____ Problem Identification and solving:										

Overall Grade: _____

Lesson Observation

Name: _____ Teacher: _____

Date: _____ Instrument: _____

1. What fundamental brass concepts were used?

2. Teaching Style (positive/negative)
    - Did the teacher model?
    - Teacher's concepts in relation to Brass Techniques Class.

3. What were the teacher's goals for you?

4. In your opinion:
    - Could you follow the teacher's logic?
    - Did you disagree with any of the concepts that were used?
    - Did the lesson topics make sense to you?
    - Did you learn anything new in the lesson?
    - What was the most challenging part of the lesson?
    - What did you gain from this lesson?

Brass Performance Requirements

The following are the requirements for a brass performance exam. Students will be required to perform on each of the four brass instruments studied (trumpet, horn, trombone, and tuba) in class. The playing exam consist of selected scales, assigned etudes, a student selected solo or etude, and sight-reading. The performance exam will take place outside of the regular class period in the presence of the brass techniques instructor, and will be evaluated using a grading rubric.

Scales: Concert Bb major (memorized), concert F, Eb, Ab major scales (read)

Students will be required to play by memory the concert Bb major scale. This scale has been chosen because it is the first major scale that beginners will learn. Students will be required to read and play the concert F major scale, Eb major scale, Ab major scale. Students will be required to play a chromatic scale, starting with low concert Bb and ascend chromatically to the octave concert Bb and descend back to concert Bb.

Assigned Etudes:

Students will be assigned three etudes from the methods course books. These etudes have been carefully chosen for the student's demonstration of range, sound, accidentals, rhythm, and overall musicality.

Prepared Solo/Etude:

Students are allowed to select a short solo or etude of their choice. This opportunity allows the student to become creative and develop a sense of ownership and gratification when performing on a new instrument.

Sight Reading:

Students will be required to sight read a short etude. This will demonstrate their working knowledge of the instrument.

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